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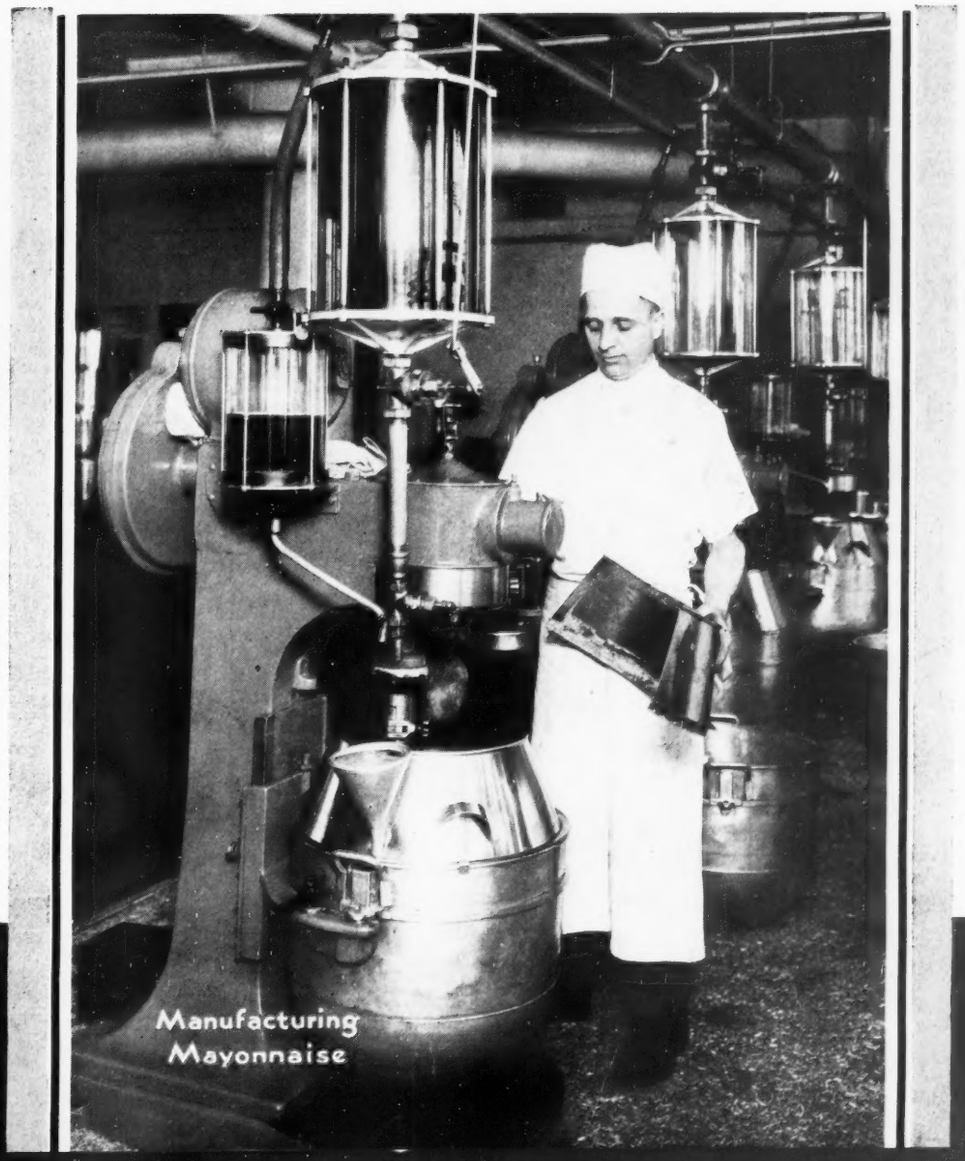

Manufacturing Mayonnaise

JULY
1931

Thermophilic Milk Bacteria

Fermentation Control

Power Factor

MCGRAW-HILL PUBLISHING COMPANY, INC.

TWENTY-FIVE CENTS PER COPY

Your Gelatine Must Be *Always Uniform*

To *Insure the Individuality of Your Product . . . Unvarying Flavor, Ideal Texture and Keeping Quality*

More and more, food product manufacturers are paying strict attention to the kind of gelatine they use.

They realize that gelatine that varies endangers the uniformity of their products.

In order to avoid this risk, they are standardizing on a gelatine that does not vary—U-cop-co.

They know that they need only weigh out a quantity of U-cop-co Gelatine to be sure of the results it will produce.

Barrel after barrel, U-cop-co has sparkling clarity; extremely low bacteria count; uniform gel strength; other important characteristics that stamp it a standard of comparison.

Only because of a vast supply of raw materials, special processes of production, and careful blending, is it possible to assure you of this uniformity.

When you purchase U-cop-co, more-over, you purchase direct from a producer who guards quality in every phase of gelatine production.

U-cop-co Gelatine is available in two forms—the granulated and the exclusive U-cop-co wheel-dried flake.

Whether you now use gelatine or whether you see possibilities of its effective use in your product, you will find it worth while to consult with our Technical Research and Service Department. Write us. United Chemical & Organic Products Company, 4100 South Ashland Avenue, Chicago.

U-cop-co
GELATINE

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VOLUME 3

FOOD INDUSTRIES

NUMBER 7

The Journal Devoted to the Problems of the Food Manufacturer

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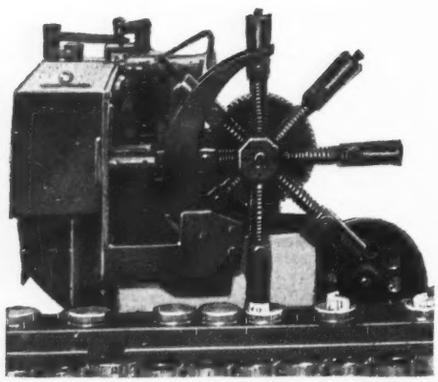
Two of several Packomatic "Scott" Scales used for weighing a complete line of seeds 15 to 20 packages per minute per scale, for Ferry-Morse Seed Company, Detroit, Michigan.



PACKOMATIC COUPON FOLDER AND FEEDER, SPEED 110 PER MINUTE

This machine in addition to feeding coupons for package inserts carefully folds them before inserting. All operations are automatic and perfectly controlled by the container equally efficient with cartons or cans.

"A direct saving beyond our expectation"

That is what one large manufacturer said after installing Packomatic Machinery:

Today you are faced with greater competition than ever before in the history of your business. Now is the logical time to abolish slow, wasteful manufacturing methods. We will show you a way to new ideas that will stimulate and speed up production, eliminate waste and increase profits.

We are proud of our 2,000 customers and are anxious to be of service to you. To this end our engineers are cheerfully at your service.

Wire—phone—or write for a Packomatic engineer. He will meet you at anytime anyplace. You are under no obligations.

PACKOMATIC

PACKAGING MACHINERY

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Branch Offices: NEW YORK ST. LOUIS LOS ANGELES

PROTECTS

both shipper and receiver alike

●

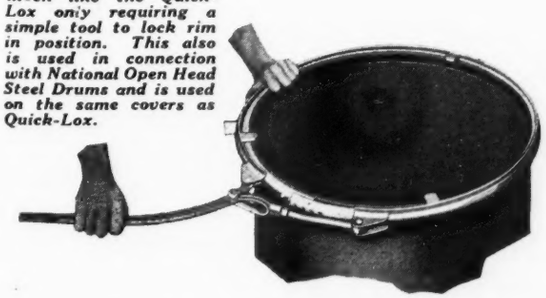
NATIONAL Open Head Steel Drums

QUICK-LOX

A one piece rim and lever arrangement which forms an air tight seal with the special designed top of National Open Head Steel Drums. Requires no nuts, bolts, screws or tools.

SNAP-LOX

A simple lock rim very much like the Quick-Lox only requiring a simple tool to lock rim in position. This also is used in connection with National Open Head Steel Drums and is used on the same covers as Quick-Lox.



This new National container not only protects the shipper against thieving, contamination and damage to his product in transit but assures foodstuffs being delivered in tip-top condition. Also it provides a package of high resale value.

Other advantages such as; ease of locking; convenience of handling; entire cover removable—no protruding rim to hold foods in; easy to clean; air, gas and oil tight; strength and durability; are sufficient reason for your careful and thoughtful consideration.

PROTECT-O-LINE

The enamel like liner which insulates your food products from the bare metal. A neutral, evenly distributed, covering which in no way affects taste, odor or composition of the foods packed in these containers either in shipment or storage. An ideal package for edible oils, quick frozen fruits, juices and similar products.

The NATIONAL Steel Barrel Co.

3860 E. 91st St., Cleveland, Ohio

From

York Research in FOOD REFRIGERATION

comes York *Leadership*

Is Refrigeration to make headway? Then, knowledge of first principles is not enough. New applications of these principles, new principles, even, must be discovered.

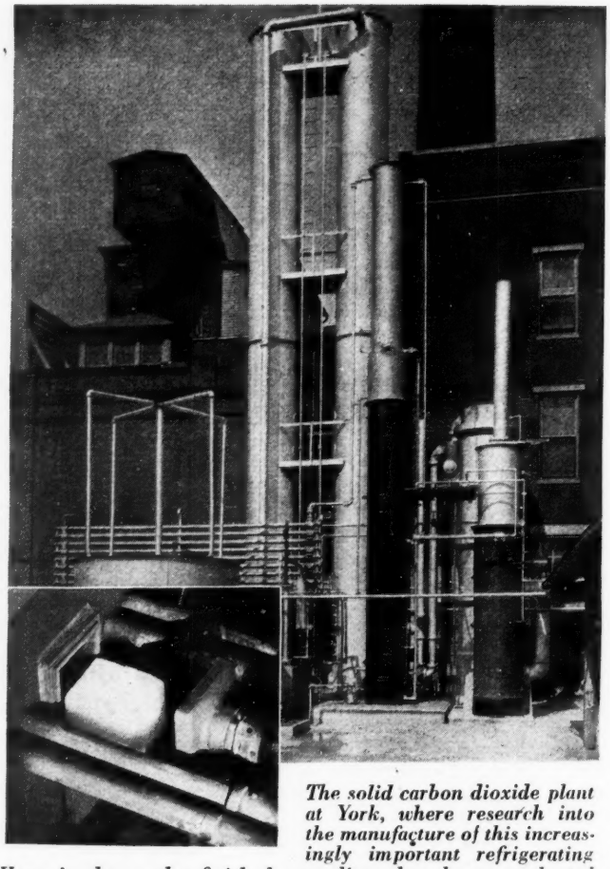
Thus, York maintains the most complete Research Laboratories in the Refrigerating Industry. Sixty-three men . . . chemists, metallurgists, refrigerating engineers . . . are constantly at work on research into every phase of refrigeration.

An example of York's thoroughness and resources is the work done on solid carbon dioxide. Even before it had attracted any wide attention in the industry, York had erected and was operating a complete solid carbon dioxide plant. Here York engineers made a full study of processes and machinery. Out of this research came sound recommendations to those engaged in the manufacture of this product.

Based on such research, York engineers recently brought out radically new developments in ammonia evaporating practice and CO_2 compressor design.

Today, York is more active than ever in research.

This explains the constant improvements and advancements in York Refrigeration. It explains why York Refrigeration is not just so much iron and steel . . . but complete installations operating with efficiency, dependability, low cost. It explains why York Refrigeration is proving to be the solution of age-old problems in an ever-growing list of industries.



Here is shown the finished block of solid carbon dioxide as it drops from the hydraulic press of the "snow machine."

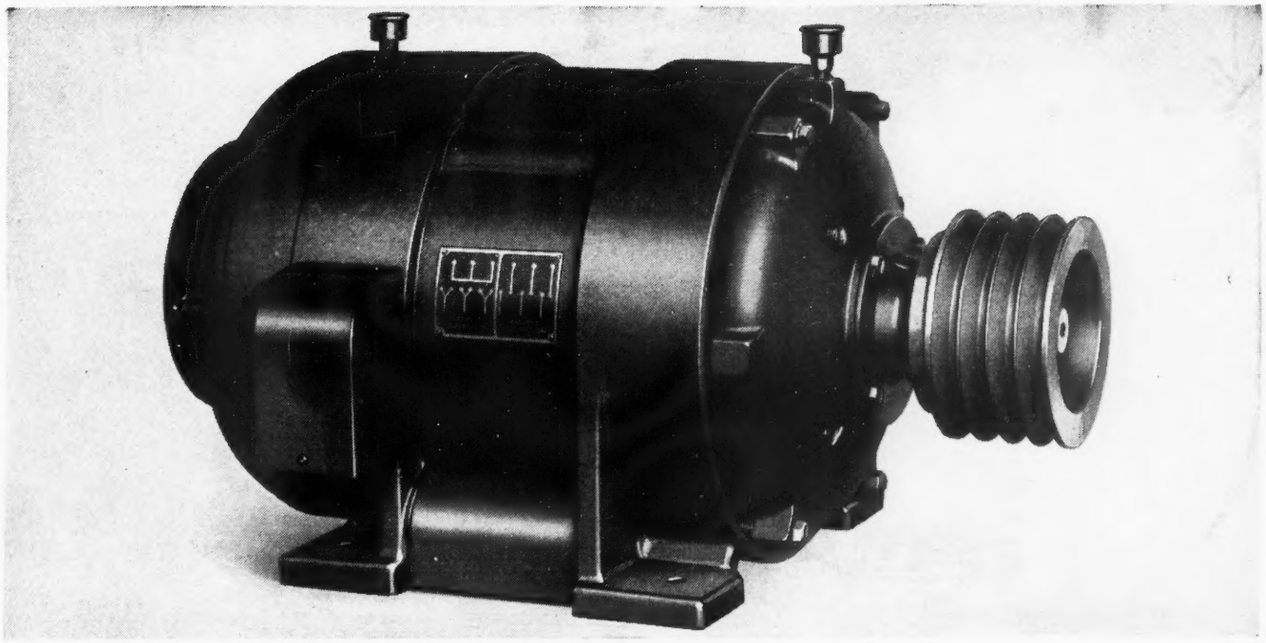
The solid carbon dioxide plant at York, where research into the manufacture of this increasingly important refrigerating medium has been conducted for several years. This photo was taken before the plant was housed.

This research is the key to York Leadership.

For further information, communicate with the nearest of York's 71 conveniently located direct factory branches.

YORK ICE MACHINERY CORPORATION, YORK, PENNSYLVANIA

YORK
REFRIGERATION



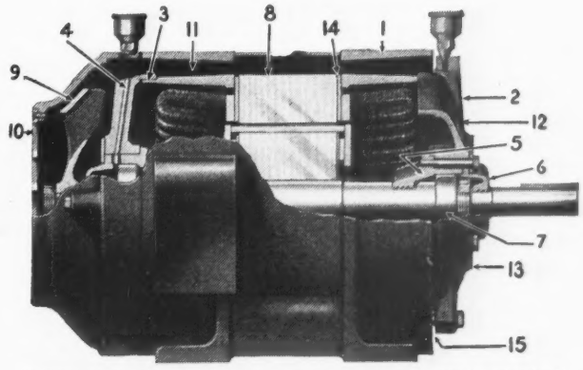
Safeguarded—

against dust, dirt, acid fumes, or moisture

—those factors that tend to shorten the life of windings — the Allis-Chalmers, totally enclosed, fan-cooled motor is ideally suited for operation in chemical plants, foundries, cement plants, crushing plants, mining and coal preparation. Being weather-proof, it is suitable for outdoor service.

Important Features

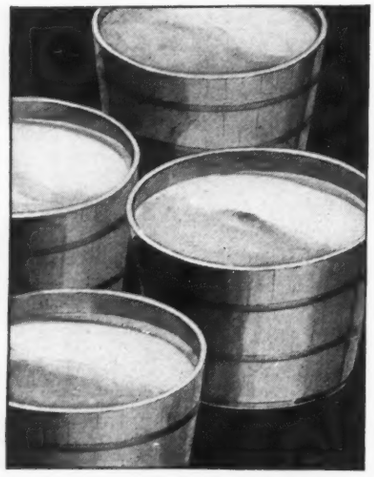
1—Cast steel end frames in combination with solid bearing housings (No. 2) provide complete enclosure without the use of sheet metal or other auxiliary parts.
2—Cast iron bearing housing serves also as end closure fitted to end frames with long rabbet fit (No. 3). Removable without exposing the bearings.
3—Rabbet fit forms a tight joint between end closure and stator frame.
4—Compression cup and grease duct, an integral part of housing assembly.
5—Bearing cartridge remains on shaft when motor is dismantled.
6—Cap secured to cartridge by screws prevents exposure of bearing and lubricant when rotor is removed.
7—Bearings of standard metric dimensions of medium series, secured by lock nut.
8—Stator and rotor laminations of silicon steel assure minimum core loss.
9—Cast aluminum fan, balanced, keyed and locked on shaft, designed for strength and efficient windage.
10—Fan housing with its grid cover completely isolates fan for safety.
11—Unobstructed air passage made shallow to increase air velocity over cooling surfaces.
12—Flush type pipe plugs for inspection of air gap.
13—Clamping ring.
14—Stator teeth supported by punchings of heavy plate steel.
15—Space for inserting a pinch bar to pry loose the bearing housings.



Sectional View Illustrating the Compact Design, Sturdy Mechanical Construction, and Accessibility.

ALLIS-CHALMERS

Allis-Chalmers Manufacturing Company, Milwaukee



Butter making is but one of the many branches of the food industry in which Diamond Crystal Salt has opened the way to greater success. We should be glad to send you detailed information regarding the selection of the salt best suited to your own product

HOW PURE *does butter salt need to be?*

THE plain facts are that salt can't be too pure for butter making. Impurities so small in amount that they can hardly be measured are nevertheless likely to produce gritty particles and harsh flavor. That's why it pays the creamery manager to use pure salt—Diamond Crystal Salt. No other salt can be made by the exclusive Alberger process—and no other salt offers such complete and uniform freedom from impurities.

80% ***of the butter makers use this pure salt***

When four out of five butter makers single out the same salt, it *must* be better. As a matter of fact, the superior purity of Diamond Crystal is easily provable—not only in the chemical laboratory, but in the finer quality of the butter it produces. Here is the only salt which naturally consists of tiny, quick dissolving flakes. Here is salt so conspicuous in freedom from gritty impurities, so outstanding in the speed and evenness with which its unique flakes dissolve, so remarkable in the richer butter flavor it promotes—that it has become the standard of the whole butter making field. Are you taking advantage of its matchless benefits? Diamond Crystal Salt Company, (Inc.). *Bulk Department*, 250 Park Avenue, New York, N. Y.

Year in, year out, Diamond Crystal Salt averages 99.9% pure—or better

DIAMOND CRYSTAL SALT

A PRODUCT OF GENERAL FOODS CORPORATION

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PROVIDING clean, conditioned, dust-free air of uniform temperature, a Buffalo Air Washer is an enormous advantage to any plant in the food industries. Because there is no method of air-cleaning as effective as washing, the air washer is supreme in this respect. With controlled heating coils, temperature is always uniform. Buffalo Air Washers are the answer in any plant where clean air is a necessity.

Hundreds of installations in large and small factories are giving economical and efficient service.

Why not find out how little a REALLY EFFICIENT air conditioning system costs?

Buffalo Forge Company
181 Broadway, Buffalo, N. Y.

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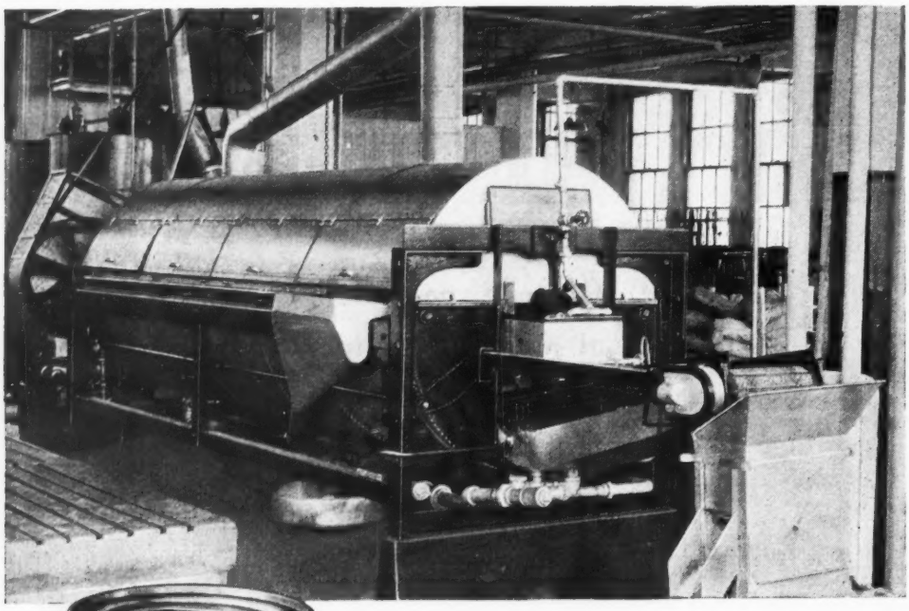
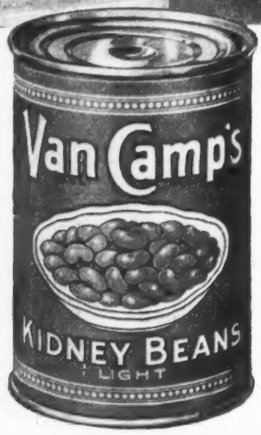
Canadian Blower & Forge Co., Ltd., Kitchener, Ontario

Natural color... Full flavor ...when beans are blanched in **Pure Nickel** *cylinders...*



Pure Nickel Monitor Blancher manufactured by the Huntley Manufacturing Co., Brocton, N. Y., and installed at the Van Camp Co., Indianapolis.



Van Camp's kidney beans—a treat for jaded appetites. Mealy...succulent...full of tempting goodness and natural flavor...no wonder they're popular with housewives—and with storekeepers! ● To insure the uniform quality of every can of kidney beans, and to prevent any possibility of discoloration, Van Camp uses blanchers equipped with cylinders of Pure, Solid Nickel. ● Nickel is used because modern canning practice demands equipment that is free from rust, corrosion-resistant. Nickel cylinders are unaffected by moisture, food juices or cleaning compounds. Nickel's glass-smooth, non-porous surface is easy to keep clean and free of stale odors at all times. It never imparts a foreign or metallic taste to the product. ● Strong as steel, with no coating to chip, crack or wear off, Pure Nickel canning equipment cuts depreciation and replacement costs to the bone. Your investment in Nickel equipment will pay worthwhile dividends in lasting satisfaction and in tangible savings. Write for further information including a copy of "Huntley Catalogue of Canning Plant Equipment."

Nickel
PROTECTS BETTER LONGER

INCO NICKEL

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

She never thought of it until...

A shopping list, a good memory and a desire to buy yet she never thought of it until the colorful sign above the counter brought it to her attention.

More merchandise is left unpurchased because it is not suggested to the shopper at the time when purchases are made than because of any lack of desire to buy. The genius of Meyercord All-Purpose signs is that they can be placed where they will remind every shopper of your product.

Whether they are on the window, counter, showcase or wall, their colorful appearance attracts the eye and suggests the name of your brand at the time when mind and purse are open to good suggestions.

Why not capitalize on the open-purse policy with Meyercord All-Purpose signs? They are made in any size, color or design desired.

MEYERCORD WINDOW SIGNS

COLORFUL DAY AND NIGHT ADVERTISEMENTS

120 SO. LASALLE ST. . . . . CHICAGO, ILLINOIS

WHEN·PARKING PAYS·A·PROFIT

Renting a place to park a car is an out-and-out expense and curb room on busy streets is difficult to find and costly to hold. But acquiring a place to park a good advertisement is always profitable. Delivery or salesmen's cars, whether on a parking lot, in front of the dealer's store, or moving through highway traffic, are splendid advertising media.

And with colorful Meyercord Weather-Tested signs on the sides and rear, these vehicles are readily converted into forceful advertisements which bring back a good share of their up-keep expense in sales and profits.

MEYERCORD *weather tested* TRANSFERS

MORE ECONOMICAL THAN HAND PAINTING — MORE ENDURING THAN THE SURFACE

TRANSPORTATION DIVISION — THE MEYERCORD CO., 120 S. LA SALLE ST., CHICAGO

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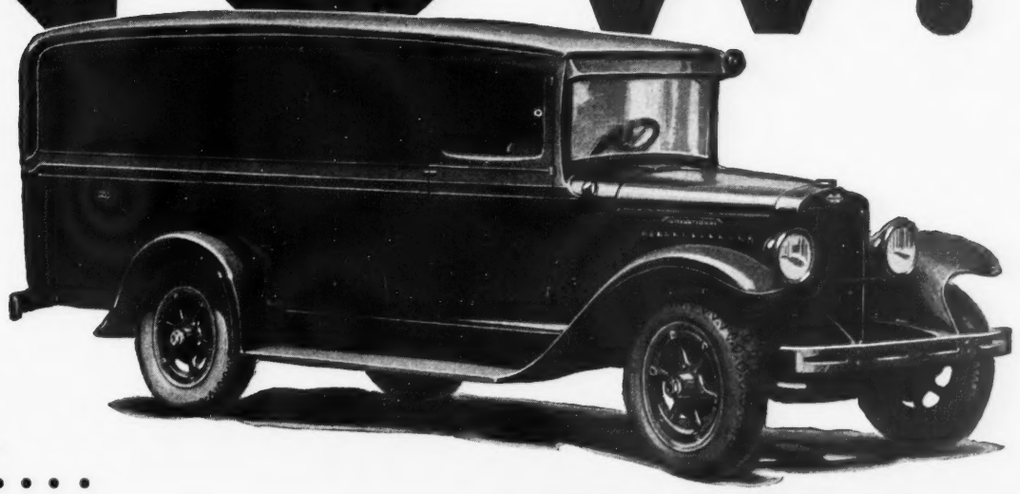

NEW....

a 1½-ton International with 4 Speeds ... True International Quality at *Low Price .... Only*

$675

136-inch wheelbase chassis, Standard equipment, f. o. b. factory

International Harvester announces a new 1½-ton, 4-speed, 136-inch wheelbase truck — the Model A-2. A better truck and with more power than International has ever been able to offer at the low price of $675. It is a true International from front bumper to tail-light, built to the most modern truck standards — a truck of the same high quality and backed by the same Company-owned service that for years has made Internationals famous for low-cost hauling.

Here are power, speed, stamina, attractive lines, and all-around dependability. Here also is absolute assurance of low upkeep cost and unusual operating economy over a long period of years and mileage.

See this new truck. Ask for a demonstration. Drive it. In no other way can you appreciate the quality that has been built into the Model A-2. It is another International achievement that will add to the ever increasing popularity of the International line. International Trucks are built in ¾ to 5-ton capacities. Bodies for every business.

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4 forward speeds · 22 ball and roller bearings · Powerful engine, L-Head type; 3⅝ in. bore, 4½ in. stroke; ample power with unusual fuel economy. · Cam-and-lever steering gear. · Vibration-dampened clutch. · 2 wheelbases: 136 and 160 in.

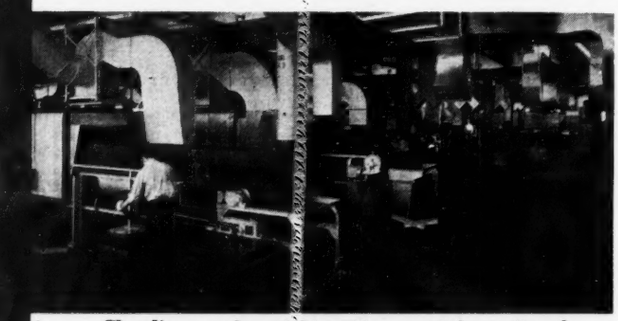
INTERNATIONAL HARVESTER COMPANY
606 S. Michigan Ave. OF AMERICA (INCORPORATED) Chicago, Illinois

INTERNATIONAL

INTERNATIONAL TRUCKS

A CONTINENTAL CRAFTSMAN

A typical press room in one of the many Continental Plants



Cleanliness and careful handling guard the quality of Continental Lithography.

CONTINENTAL LITHOGRAPHY

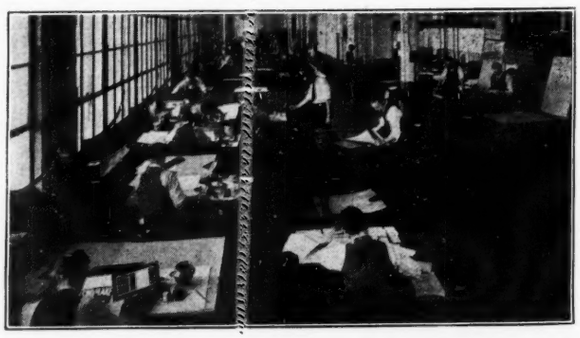
... increases the sales value of any well designed can

HUNDREDS of products everywhere are winning front line display, through the aid of Continental lithographed cans produced by an organization of craftsmen skilled in the art.

Hundreds of thousands of dollars—years of experience—continuous research and experiment—all enter into Continental Lithography so that you may have sparkling, colorful cans faithfully reproducing your designs.

Batteries of modern lithographic equipment are strategically located in Continental plants from Coast to Coast. Master engraving plants, at central points, equipped with most modern apparatus supply all Continental lithograph shops with superior printing plates.

Continental Lithography insures attention value for your cans and helps increase sales.



Continental's "Specialists in Packaging Designs" can offer many suggestions for modernizing your old packages or creating entirely new ones.

CONTINENTAL CAN COMPANY INC.

NEW YORK: 100 E. 42nd St. · CHICAGO: 111 W. Washington St.
SAN FRANCISCO: 155 Montgomery St.

"It's Better Packed in Tin"

IN HANDLING MILK, PRESERVING FRUITS, CANNING VEGETABLES, MAKING BEVERAGES,

—you need the cleanliness and resistance to acids that Pfaudler glass lined steel equipment provides. But we've got more than this to offer! Pfaudler is recognized for engineering leadership.

In every branch of the food industry there are certain products and certain operations on which Pfaudler process units pay a big return. The pasteurization, storage, transportation of milk, cream, ice cream mix are some. For these operations Pfaudler can assure you a *pure* product, accurate temperature control, low steam costs, low cleaning costs, long life and attractive designs—all at attractive prices!

The same advantages apply in the canning, food and beverage industries. Glass lined vacuum pans for fruit products and juices, tomato cookers, brining tanks, mayonnaise mixers, vanilla percolators, corn cookers, syrup mixers are designed for the specific operation. That's why Pfaudler equipment produces better results—or we wouldn't build it.

Such leading concerns as Borden's, National Dairy, General Ice Cream, Standard Brands, Libby's, Canada Dry, Coca Cola and many others use Pfaudler equipment consistently in all plants, because it has paid. For bulletins on Pfaudler glass lined food handling machinery, use the coupon below.

PFAUDLER GLASS LINED

STEEL MIXERS, COOKERS, COOLING AND STORAGE TANKS BUILT FROM 10 TO 7000 GALS.

THE PFAUDLER CO., 1510 Gas & Electric Bl'g., Rochester, N. Y.

Send us bulletins checked: Pasteurizers, truck tanks, mixers, vacuum pans, tomato cookers, mayonnaise mixers, vanilla percolators, corn cookers, brining tanks, storage tanks.

INDIVIDUAL ..... COMPANY .....

ADDRESS .....

It's up to YOU..

YOU GET PAYING RESULTS WITH 'UNIQUE" MIXERS

Do you want to save minutes per batch—and dollars per minute in mixing?

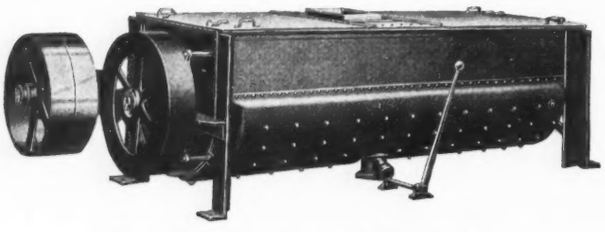
YOU CAN

There are three "times" to be figured when computing mixing costs:—the time necessary to load and discharge; time required for a thorough mix; and time out for cleaning and repairs. Unnecessary time eats into overhead and production costs—so, by building Unique Mixers to reduce time on all operations to the absolute minimum, *you* save the difference.

Then consider that, for the same capacity, Unique Mixers consume from 15% to 30% less power than other models—you have almost the whole story. To get the rest you will have to see the improvement in your product. It's up to you. Think it over.

ROBINSON MFG. CO.

71 PAINTER ST., MUNCY, PA.



Steam-Jacketed Mixer with Half Jacket
Also Furnished with Full Jacket

UNIQUE

CRUSHERS GRINDERS
MIXERS SIFTERS
ELEVATORS CONVEYORS
BINS HOPPERS TANKS

DODGE RESOURCES GUARANTEE EXCEPTIONAL TRUCK VALUE FOR FOOD MERCHANTS

Part-by-part inspection will prove to you the surpassing merit of Dodge Trucks. Or you can get your proof by actual test. Or you can rely on the recommendations of other business men who own Dodge Trucks and know from actual experience what they will do. » » And whether you use one or all of these yardsticks, you can be certain that exceptional value is guaranteed by Dodge resources. Resources that can be reckoned not alone in dollars. Or in dollars plus modern and efficient plants and equipment. Those are vitally essential, to be sure. But Dodge resources also include a still more important factor—the experience Dodge engineers and workmen have gained in the building of more than four hundred thousand trucks. Experience that assures you the modern design, precision construction and part-to-part balance that will be reflected in greater dependability, lower cost and able performance throughout the truck's long life. » » See your nearest Dodge Brothers dealer. Inspect and test the type of Dodge Truck (Standard or Heavy-Duty) that exactly fits your needs. You will say it is every inch a modern truck—an exceptional value at its low price.

CAPACITIES IN THE HEAVY-DUTY LINE RANGE FROM 3,600 TO 11,175 POUNDS —AND UP, FOR TRACTOR AND TRAILER SERVICE. PRICES ARE EXCEPTIONALLY LOW. » » THE STANDARD LINE RANGES IN PAYLOAD CAPACITY FROM 1,200 TO 4,300 POUNDS AND INCLUDES THE 1½-TON CHASSIS AT . . . . . $595 F. O. B. DETROIT

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DODGE BROTHERS CORPORATION C-17
Detroit, Michigan
Send your Operating Record Book. I understand there is no obligation.

NAME _____
ADDRESS _____
CITY _____ STATE _____
Number of Trucks Operated (Book for each will be sent) _____

DEPENDABLE
DODGE TRUCKS

Wrapping Department in one of the Best Foods plants. The Nucoa prints are conveyed from the cutting machine to the cartoning machines. The cartons are then fed automatically to the waxed-paper wrapping machines, which discharge the finished product to the packers, who place the goods in shipping containers.

Perfect packaging helps to make it *"one of the best foods"*

It is one thing to make a perfect food product—it is quite another problem to get that product to the consumer in perfect condition.

The makers of Nucoa, like so many other successful food manufacturers, depend upon the wrapping produced by our machines to accomplish this important task.

The air-tight waxed wrapper, in which the Nucoa cartons are sealed, retains the freshness of the product, and protects its delicate flavor from outside contaminating influences.

Our machines are adaptable to every kind of wrapping material—Cellophane, waxed paper, glassine, foil, plain paper, etc. We can give you the type of wrapping best suited to your product.

A Better Package—Lower Costs

If you desire to improve the appearance of your product, to give your goods greater protection, or to lower your packaging costs, get in touch with us. We can give you the benefit of over a quarter-century's experience gained in working for America's leading package goods manufacturers.

PACKAGE MACHINERY COMPANY
Springfield, Massachusetts
New York Chicago Los Angeles
London: Baker Perkins, Ltd.

"How About Interest on Investment, and Depreciation on Hackney Permanent Containers?"

THAT'S a logical question that users of single trip containers are sure to ask. And the answer lies in the actual *cost per trip* of delivering the products to their destination.

After charging interest and depreciation—as well as return freight, extra freight on out-shipments, maintenance, cleaning, insurance, and clerical costs—Hackneys frequently show saving as high as 50% over single trip packages made of steel or other materials.

For example, manufacturer "A" reduced his costs from $27,125 per year to $12,586 by changing from light weight shippers to Hackney Removable Head Steel Drums. Another saved $11,160 per year by using Hackney steel barrels with patented raised openings. These are only two of a large number of similar examples.

Consult us regarding the possibility of using Hackney permanent containers to ship your liquid or dry bulk materials. Together, we may be able to work out a substantial saving in your shipping costs.

A Few Prominent Hackney Users

Sherwin-Williams
C. M. St. P. & P.
Swift & Co.
Durkee Famous Foods
Cook Paint and Varnish
Colgate-Palmolive-Peet
Capitol City Products
Vacuum Oil

PRESSED STEEL TANK COMPANY
1173 Continental Bank Bldg., Chicago
1349 Vanderbilt Concourse Bldg., New York City
5771 Greenfield Avenue, Milwaukee, Wis.
477 Roosevelt Bldg., Los Angeles

Hackney
MILWAUKEE

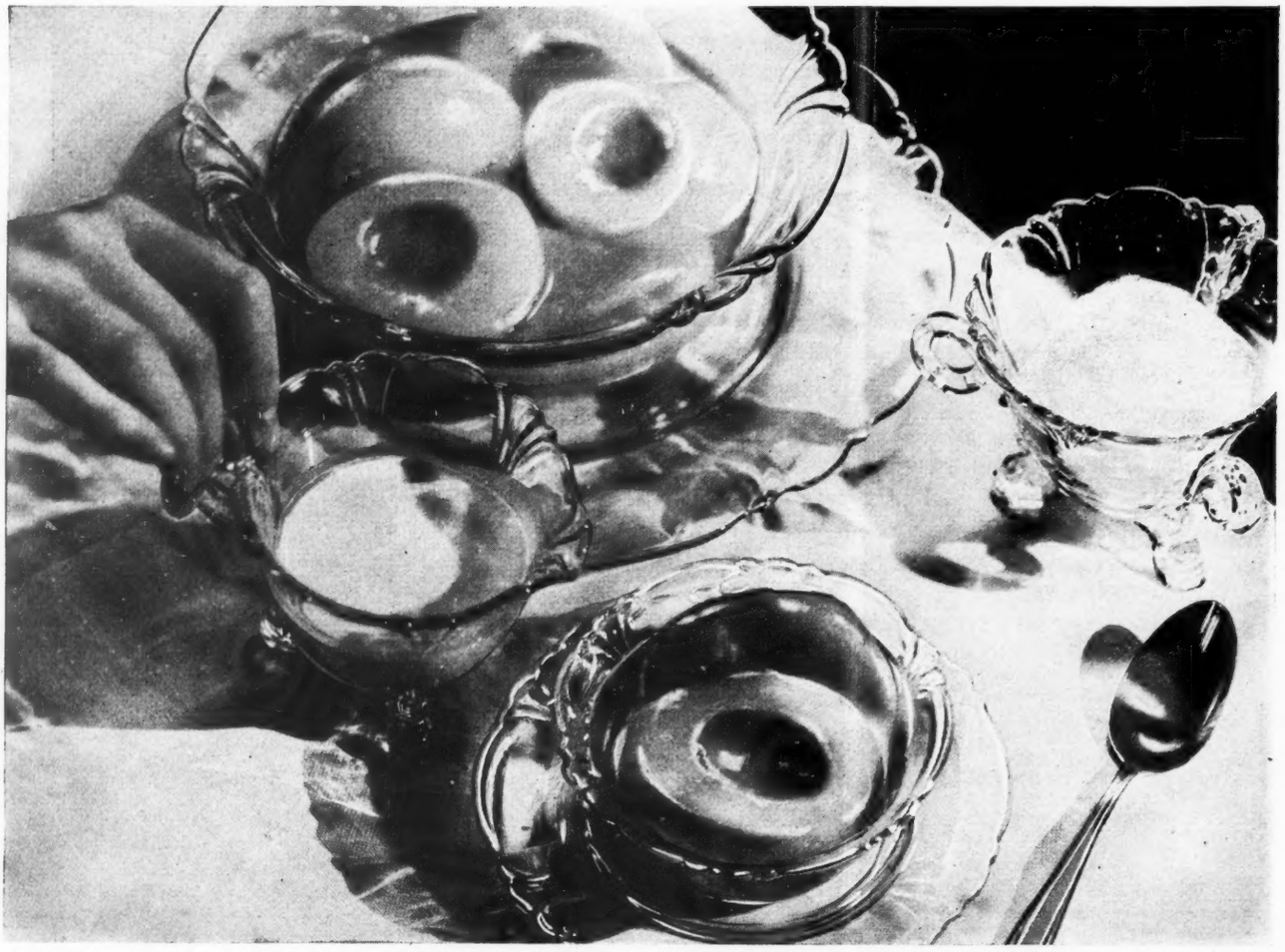
Canned Peaches . .

PUT yourself in the consumer's place! What makes you use more canned peaches? When you have found a brand, uniformly fine in appearance and flavor, aren't you likely to want more of the same kind? But if you get some that are lacking in quality, improperly graded, without full, ripe flavor, you are hardly inclined to try another can. Uniform quality plays a tremendous role. It is of first importance to all of us.

Uniformly high quality in this season's pack depends largely on the care canners exercise in checking every canning detail, from picking the peaches to the actual processing of the crop. To get good, uniform color—the peaches must be picked at just the right time, when they are beginning to soften. And to insure layering without breakage, they must be carefully blanched before filling into the can. Quality only becomes a fact when these and *every other* detail of peach canning are given close attention.

The research department of the American Can Company offers its aid and experience to peach canners in helping to solve certain specific conditions that might affect *quality.* You are urged to make full use of this service.

AMERICAN CAN COMPANY CANCO



FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

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Laurence V. Burton, Editor

Do Not Neglect Obsolescence

ONE OF THE GREATEST DANGERS facing the food-manufacturing industries today is that the present slow replacement of obsolete equipment will continue. Protracted periods of poor business quite naturally cause the neglect of modernization that would be made unquestioningly during normally prosperous times.

OF COURSE, such neglect is not the wisest course, nor would it be necessary if proper reserves were set up when business is good. "In times of peace, prepare for war," may be a discredited adage in pacifist circles; but it is an exceedingly sound course for industrial executives to follow. If wise policies have made the funds available, no better time than one of slack production can be found for bringing factory equipment up to date.

IN ADDITION, it is becoming evident that those who manufacture production equipment choose times like the present to exert redoubled efforts to place on the market new and improved machines. This could have been predicted from past experience, and attendance at a number of recent exhibits of food processing equipment shows that it is true.

IT IS OBVIOUS that those who can and do take advantage of lowered demands on existing plant to modernize their production equipment will be in a position to profit greatly when demand for their product picks up.

BUT IT ALSO IS OBVIOUS that many are too timid, or, from lack of foresight, are too short of funds, to follow any such course. To these it may be pointed out that there is a plentiful supply of funds in loaning institutions. True, the holders of these funds seem somewhat overcautious in extending credit. But borrowing for a carefully planned modernization campaign involves little risk if no increase in production-capacity is contemplated. The present caution of agencies with money to loan probably guarantees against much increase of capacity on borrowed funds.

THERE WILL NOT be another time as good as the present in many years for the conservative food manufacturer to remove the burden of obsolescence from his operations. Not only is the time propitious for such action but it is gratifying to note that in some recently visited plants such rehabilitation is being done. Furthermore, the indications are that some of these plants, which have been of the marginal type in the past few years, are actually becoming profitable to their owners as this rehabilitation progresses.

Suspension of Debt Payments Will Help

PRESIDENT HOOVER'S proposal of a suspension for one year of all payments on intergovernmental debts, reparations, and relief debts, both principal and interest, deserves unqualified approval. Examined from any angle, political or economic, it is a thoroughly practical move. These payments for which a moratorium is now proposed are widely charged with an active responsibility for the present depressed world prices of commodities, including foods. Payment can be made only in gold, goods, or credits, none of which is particularly welcome or helpful to the principal creditor, the United States. A one-year suspension may not entirely restore prosperity, but it should be distinctly beneficial, for it will remove any necessity for debtor nations to cut export prices in order to get the gold to pay this country.

We can expect this move to be followed by better prices and less business done at a loss. In the President's words, the plan is proposed to "give the forthcoming year to the economic recovery of the world and to help free the recuperative forces already in motion in the United States from retarding influences from abroad." Perhaps the most important result will be in overcoming the lack of confidence that is the root of our present business troubles.

Approval of foreign governments and of Congress is necessary before the moratorium can be put into effect. It is probable that Congressional action cannot be had before December at the earliest, but the prompt indorsement of the plan by most European governments and by many influential Senators and Representatives should go far to produce the spirit of confidence upon which the structure of renewed prosperity must be built.

Action Next!

READERS will recall "A Platform for American Business," mailed to all FOOD INDUSTRIES subscribers as a supplement to the March number. This supplement also went out with 21 other McGraw-Hill periodicals. Since then over 800 letters from presidents and other top executives of important American business firms, dealing with this platform, have been received by the McGraw-Hill Publishing Company.

As might have been predicted, many of these letters were rubber-stamp acceptances of the principles laid down in the platform, indicating that their writers had no well-defined intention of following its recommendations. Vastly more of the letters, however, showed that the writers had given the matter much thought and already had taken, or in the near future would take, such action as they could along the lines of the platform.

Food companies were well represented among the replies, and many of their answers indicated a foreseeing thoughtfulness that promises well for the future stability and success of the food manufacturing field. Comments from the mayonnaise industry indicate cooperative activities now under way that will advance some of the principles laid down. Bakery interests stress the work they are doing in sales control. Meat packers show constructive activities looking toward the stabilization of employment and wages, and the establishment of coordination within the industry. Packers join the chocolate manufacturers in advocacy of consumer education in maintaining a high standard of living without extravagance, to the end that, through savings laid away by consumers, industry may be aided in solving unemployment problems. The candy and chocolate industries also are actively endeavoring to control and coordinate production and sales, in the interest of stabilization.

An important concern in the vegetable oil field thought so well of the whole platform that it obtained 500 additional copies, to be given to those who would cooperate in realizing its recommendations. A large factor in the nut-processing industry stated that he was already trying to follow, in his own business, all the principles set down. A manufacturer of coffee, tea, and spices asked for a number of copies of the platform, to be used in helping his organization to follow it out.

This is but a hasty glance at the correspondence prompted by the platform. The letters indicate acceptance of the need for adopting the course recommended. Some have acted in that direction already. Others hesitate. General improvement awaits action by all.

Sugar Cooperates With Canning

THE recent announcement from a large sugar company that it has prepared a special run of sugar under bacteriologically controlled conditions deserves compliment. As was pointed out on page 98, in FOOD INDUSTRIES, March, 1930, the production of a refined sugar free from thermophilic bacteria or their spores constitutes an opportunity that refiners should not overlook.

While the use of such a special sugar in a canning factory does not relieve the manufacturer from all his technical problems that relate to spoilage, it will be a material help to the packers of non-acid food in which sugar is incorporated, in avoiding unexpected or unanticipated mishaps.

This form of cooperation between branches of the food industries will not go unrewarded. There still remains, however, the educational problem, for many canners who have escaped difficulty and spoilage for many years, believe that trouble from this source can never come their way. Knowing something of human nature, we believe it is safe to predict that the mobile laboratory of the National Canners' Association which goes from place to place during the busy canning season will still have several years of intense activity ahead of it before the entire industry is conscious of this obscure source of trouble.

More Ways to Save Money

NOT all the uses of automatic control in food manufacture have yet been discovered. In fact, the surface of the subject has been but barely scratched, for one thinks of a whole series of applications that apparently have not received much attention.

Many liquid and semi-solid foods will conduct electricity and therefore offer excellent opportunities for automatic control. As a rule, a solution of an electrolytic substance has a conductivity that varies directly with its concentration. In California, some peach canners make use of the conductivity of lye-peeling solutions to determine the effective concentration of the lye. A spark plug in the side of the tank is the simple yet effective electrode used. In Florida, the spark plug is doing efficient service in tanks of orange juice, indicating when the juice reaches a certain height in a closed tank. The plug is connected in series with a red bulb and wired for alternating current. When the orange juice rises high enough to complete the circuit, the lamp flashes on, signaling an operator.

Someone should invent an automatic pulp concentration controller for tomato pulp and catsup manufac-

ture. Proper control of pulp manufacture requires analytical procedure that will give accurate results on the run. Hydrometers, pycnometers, balances, and refractometers are now all in use, but the last word in such work would be the use of an automatic electrical control that would function to cut off the steam as soon as the pulp reach a proper concentration. In this day of slim profits the manufacturer of tomato products should be able to hit the mark exactly with no jockeying or juggling.

In pickle manufacture the door is wide open for applications of conductivity to control. Instead of the usual fragile salometers (hydrometers graduated to read on the salometer scale) why not use a spark plug and an ammeter calibrated to read in salometer degrees or per cent of salt in brines? Even vinegar solutions are worthy of study from this angle. So many possible uses of this form of automatic control come easily to mind that it seems strange that all of them are not in use already.

Final Decision on Packages

THE best discussion of package design, from the factory viewpoint, that we have ever seen was written by Francis Chilson in May *Printers' Ink Monthly*. The author is unknown to us but his article, entitled "The Production Phase of Package Design" at once identifies him as one who knows his business.

About a year ago FOOD INDUSTRIES made a study of the origin of package designs in leading food plants and discovered that in 52 per cent of the cases the production department, exclusive of general executives, was responsible for originating changes in design and that the sales department was responsible in only 14 per cent of the cases. Mr. Chilson furnishes a very lucid explanation of this unexpected finding, for "when advertising men create packages they invariably are conscious of only two objects: first, harmony of design; second, the purpose for which the package is to be used. Rarely is practicability of a given design considered from a production viewpoint, because few advertising men and salesmen are familiar with the mechanical problems of construction. . . . If advertising men were fully cognizant of the factory angle of design *they could actually lower factory costs* . . ."

Furthermore, he points out that "the advertising man should avoid an untried closure unless its efficacy is first attested to by laboratory and factory experience. This is the one phase of package design above all others that no one should gamble with. . . .

"The limitations imposed by production processes place no insuperable restrictions on the free expression of the artistic temperament. . . ."

Failure to understand production problems has led to the design of many impossible packages. Less than twelve months ago a beautiful modernistic line of glass bottles was developed, but unhappily, they would not stand upright on a conveyor. If we remember the circumstances correctly, the sales department of a large food manufacturer had insisted on these bottles without the production department's approval. The only way they could be made to ride upright on a conveyor through a filling machine was by placing them in tin cans!

One feature of packaging, however, was not treated by Mr. Chilson, and it is most important: namely, the effect of the package on the product itself, which places a further limitation on package design. Certain cereal preparations must be packed in loose cartons because they develop off-flavors in airtight containers. On the other hand, the tight seal is imperative with hard candies. Again, certain synthetic colors are sensitive to light and will fade in transparent packages.

The professional package designer should not be expected to know all these details, vitally essential though they may be. He must confer with the production man at every step, and the production man must have the final decision.

What Price a Medical Blessing?

PRODUCTION of foods with improved dietetic qualities of one kind or another is unquestionably meritorious. Blatant use of such dietetic advantages as the preeminent factor in sales appeal, however, is a dangerous business that may easily defeat its own ends.

Probably there is no foodstuff in common use today for which, by careful choice of wording, some dietetic advantage cannot be featured. Page after page of bold type tells us that the chief virtue of a candy is its quick energy value, the chief value of a bread its added vitamin D, chief virtue of fish its iodine, chief virtue of a canned product its vitamin content, chief virtue of macaroni its "energy trio," chief virtue of a cereal its "vegetable effect." Now all of these statements may be perfectly true, but when shouted from the same platform, truth, half-truth, and unfounded exaggeration are likely to slip into the same category in the mind of the consumer. Already, competition has forced certain advertising of this type nearer and nearer the boundary line between legitimate claims and pseudo-medicinal deception.

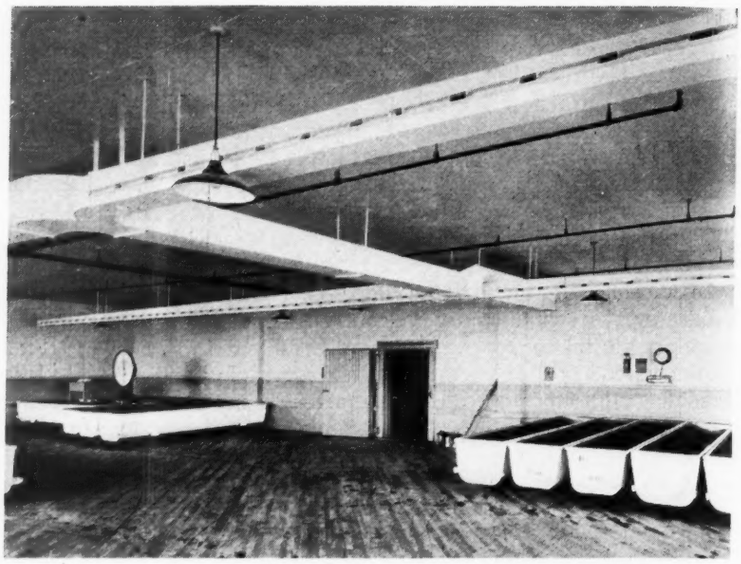
The committee on foods of the American Medical Association, by giving its indorsement to products whose quality and advertising claims it considers satisfactory, is now undertaking to separate the sheep from the goats. Of 500 foods submitted, but 75 have been accepted. Other manufacturers are said to be planning radical changes in formulas, trade names, and advertising practices to gain this approval.

True "health-food" advertising unquestionably is better than false "health-food" advertising, and to that extent the seal of approval of the committee will serve a useful purpose. There is no reason to admit, however, that eating has yet been reduced to a subdivision of medical science.

Originally, indorsement by the Medical Association's committee was intended only for foods having special dietetic properties. The surprising part of the matter is that food manufacturers generally, by stressing health claims for ordinary foods, are building it into a virtual board of censorship for foods of all kinds. If the public chooses to accept this seal of approval as the criterion for food purchases in general, manufacturers will have taken to themselves a regulatory power which, acting through the medium of public opinion, may be far more strict than the staunchest supporter of the Food and Drug Administration ever desired.

Those who are featuring legitimate health claims for wholesome foods may feel the necessity for this protective medical blessing in their competition with the more vociferous food-fad fakers. But those who are wise enough to base their production, and promotion, on the attractive appearance and good taste that come from real, honest-to-goodness quality may well let the physicians concentrate on medicine and the fakers concentrate on the faddists while they concentrate on satisfying the great American appetite.

Specialized Air-Conditioning Improves Fermentation Control



In humidifiers of the central type the treated air is conducted through ducts from point of treatment to be distributed throughout the plant to desired departments

By RUURD FENNEMA
Bakeries Service Corp.
New York City

PROPER control of atmospheric conditions is crucial at two specific stages in modern bread baking: first, directly after the doughs are mixed; and second, immediately after the loaves are molded and panned.

Doughs are mixed in large power-driven mixers in average quantities of 1,000 lb. and are placed in troughs to ferment. At this stage it is essential that both temperature and humidity be kept as nearly constant as possible, to insure a uniform dough fermentation: the temperature to be 80 deg. F. dry bulb, and the relative humidity 76 per cent. Presence of air currents makes it necessary, in some installations, to carry the percentage of humidity higher than 76 per cent, and the entire absence of air currents makes it possible and desirable to carry the humidity lower. The humidity should be carried as low as the design of the system permits and still not crust the dough.

In the early days, before the advent of artificial humidification, the baker would cover the dough troughs with canvas or moist cheesecloth to prevent the dough from crusting during the fermentation period. Thus, it would stand in the warm, dry atmosphere of the bakery for a period averaging five hours. As production increased, this method had to be abandoned, and the air surrounding the troughs had to be humidified to decrease the evaporation of the water from the dough mass and to prevent crusting while lying in the trough. The temperature of the dough room usually is held at 80 deg. F. with a variation of not more than ± 0.5 deg. F. Also, to limit the evaporation of water from the dough, the air in the room must be as still as possible. If there is any circulation of air in the room, the dough has a tendency to dry out and crust. This factor often is lost sight of by humidifier manufacturers whose contracts specify temperature and humidity limitations without mentioning drafts. Drafts may be desirable in dehumidifying processes but are the principal reason why many bakery humidifiers have turned out to be failures.

In a majority of bakeries the dough mixing machinery is installed in the same room in which the doughs ferment. This involves the necessity, when designing the humidifier, of considering the excess heat expelled by the motors of the mixing machines and of providing necessary fresh air for the mixer operators, as regulated by state labor laws. The latter ruling has caused manufacturers of early humidifying systems to oversize their machine capacity, thereby creating frequent air changes, which in turn create high velocities through the distribution ducts, which, to meet competition, are purposely designed too small.

It is obvious, therefore, that, to obtain proper conditions, a dough fermentation room should be designed to house only the setting-dough troughs. This room in cubical content should be as small as possible, in floor space large enough to manipulate the dough troughs from the mixing room to the dough room, and in height not over 7 ft. All walls, ceilings, and floors should be insulated with cork or similar material, non-absorbent and of a thickness to withhold the penetrating cold and heat of the changing seasons. This will vary with the location of the building, but an insulating material always should be of such value and thickness as never to allow the inside surface of the walls and ceilings to be lower than the dew point of the room, which in this case will be 72 deg. F. The average dough room usually is insulated with 2 in. of cork on the roof slab protected by the roofing, and 2 in. of cork on the inside of the outside brick walls. Partition walls may be either 3-in., self-supporting cork walls or stud-supported walls insulated with commercial fiber insulation of equal conductive quality. However, the final inside wall finish should be of a non-absorbent material, preferably of a hard salt-glazed brick or tile, in order that the walls may be cleaned to prevent possible development of mold growth.

The ceiling, if of poured concrete, should be free from fins. In case a hung ceiling is used below the structural roof, it should be of metal lath and plaster, properly hung, with a final plaster coat of hard cement plaster. Windows of any kind are unnecessary, but if used, they should be constructed with double sash and double-strength glass, in order to prevent excess heat loss

and condensation. Waterproof lighting fixtures should be recessed into the ceiling and arranged for a general illumination of not less than 3 foot-candles. Doors for entrance to the dough room should be of a double type, double-acting, self-closing, and properly protected with steel bumpers at a height where an entering dough trough would strike. Floors may be made of non-absorbent material such as cement, brick, or tile, but if the dough troughs to be used are of a floor rolling type, a hard maple wood floor, laid diagonally, has been found most serviceable. All wall and ceiling surfaces, except glazed tile, should be painted with a non-odorous, mold-resisting paint, light in color, so that the utmost care in sanitation can be exercised.

Although it is necessary for the baker to enter the dough room at intervals to punch or cut the dough mass, it is not wholly necessary to supply outside fresh air for human consumption. Therefore, the least possible amount of circulation should be figured; this amount merely providing a safe margin over all possible infiltration or natural air changes due to opening of doors and to leakage.

Some bakers prefer humidifiers of the central heating and cooling type, which are designed to take care of all heat losses due to conductivity through walls, ceiling, and floor, as well as air changes due to infiltration and opening of doors. These heat losses, when figured on the unit basis, will require heaters for winter, cooled circulating spray water in summer, and a large fan capacity to make this heat exchange possible. When contemplating such installations, the baker must insist upon oversize ducts and low discharge velocities, in order not to create the drafts which crust the doughs.

It is desirable, therefore, to eliminate from the central unit the cooling and heating units which offset the heat losses by placing them as radiators and as cooling coils against the outside walls. Such radiators should be placed near the floor and below windows if windows are in the dough room, as this location will cause evaporation of the moisture which might possibly form on the windows. In the central unit system, formation of moisture cannot be prevented except by excessive insulation. A

A rotating disk and fan unit for expelling a regulated amount of spray water generally is used in systems that regulate temperature with dry coils

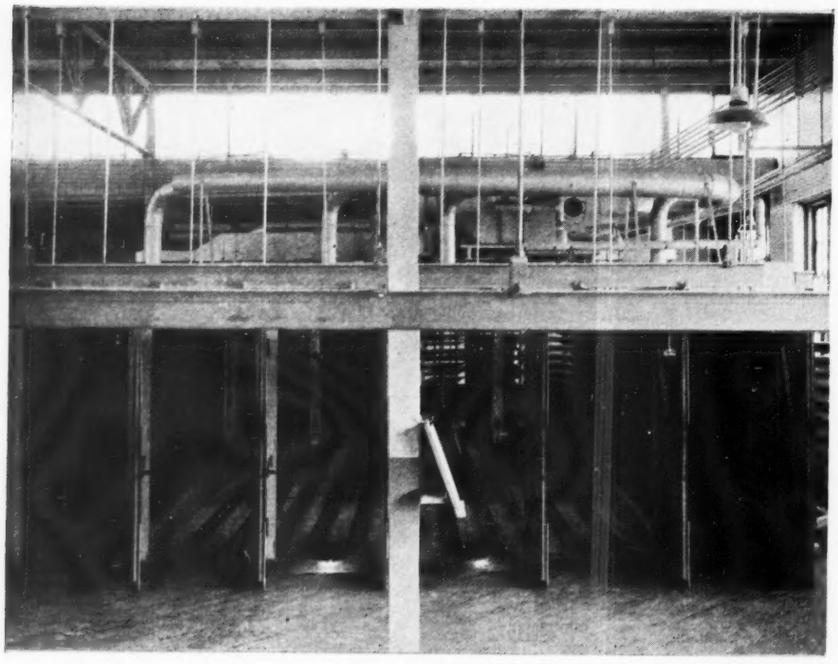
Self-contained air-conditioning unit built to meet dough fermentation room conditions

rapid growth of mold is promoted if water is allowed to run on walls and floor.

All or a large percentage of radiators and pipe coils for heating should be piped in parallel for steam and return. Also a thermostatic control valve of room-control type should be placed in the main steam line feeding these radiators, with the control bulb located centrally in the dough room. The face of the radiator or coils should be protected with a sheet asbestos shield to prevent direct heat from coming in contact with the nearest dough. All heat should deflect upward toward the ceiling to blanket off all possible cold penetrating the walls.

Cooling coils should be placed near the ceiling and be of sufficient size to offset properly all entering heat, keeping the dough room at 80 deg. F. in summer. The cooling medium may be either brine or direct ammonia expansion. Due to its controllability, brine has been used in almost all commercial plants, even in the baking industry. Frequent trouble has been encountered, however, when large automatic brine-controlled dough-room coilage has held its brine contents and heated up to room temperature before discharging. This condition upsets the remainder of the refrigeration used in the bakery and makes necessary the use of larger ammonia compressors and condensers or a large holdover storage tank where enough brine can be stored up to offset this condition. This trouble, together with the improvement in automatic ammonia controls, has largely eliminated the use of brine systems in bakeries. It is far better and less expensive to connect the cooling coils with direct ammonia expansion, using the flooded system, whereby at all times liquid ammonia under low-pressure exists in the cooling coils, rather than evaporating ammonia, which causes a further lowering of temperature, even though the automatic control valve may be shut. An automatic control valve should be located in the liquid supply line and the thermostat for this valve should be located centrally in the dough room near the radiator control valve bulb.

The heating and cooling medium for directing heat conductivity and infiltration having been so taken care



Proof-room conditioning can best be done by a unit specifically designed

of as to maintain a temperature of 80 deg. F. dry bulb, the system now requires the introduction of humidity into the dough room to obtain the required 76 per cent relative humidity. There are several standard humidifiers on the market that are used more or less successfully in connection with steam and cooling-coil installations. The principle of these is to throw a fine mistlike spray of water into the room by means of a rotating disk and fan, constructed either horizontally or vertically on a common motor shaft driven by a small motor. A control instrument is located behind the fan, on the suction side, and thus regulates the quantity of spray water needed to maintain the wet bulb temperature of the recirculated air.

In order that these types of humidifiers may work properly in a large room, it is necessary to place two or more units in such positions that one unit will pick up the recirculated air of the next unit, thereby making a complete cycle around the room. This cannot always be done properly, because of the construction of the ceiling or location of pipes and coils; frequently sprays from this type of equipment condense on near-by columns, pipe obstructions, or other objects. Then, too, due to the delicacy of the control instruments, which may become clogged up with flour dust, an uneven spray is observed. The latter difficulty will not be so often encountered in the central type of humidifier, for the spray chamber acts as an air washer and the return air does not get into direct contact with the control instrument as it does in the rotary disk type, where the moist return air, laden with fine particles of flour dust, does come in contact with the control element. Also, the control instruments of the large central units are more rugged and therefore less affected.

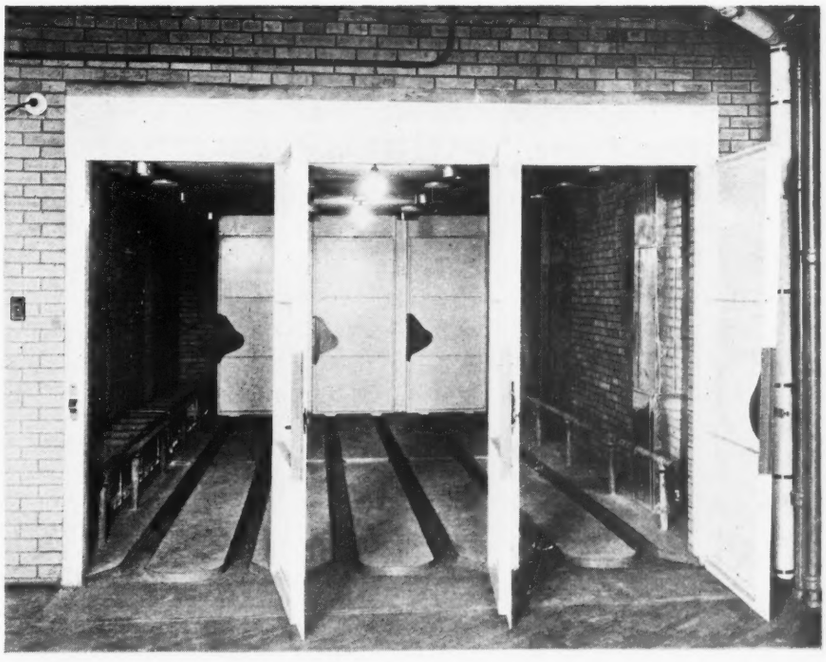
Other occurrences which make frequent adjustments necessary are changes in water pressure in cases where the humidifiers are connected directly to the city water line, and differences in water temperature, because of the high temperature and humidity content in relation to the surrounding temperatures. Water temperature should be kept as near 72 deg. F. as possible. The spray water, if above or below the dew point of the room, must have the total heat of the mixture corrected by either the dry heating or cooling coils. These, if controlled at all, are controlled separately, and therefore a short time elapses before the controls and coils act, during which time improper functioning is observed in the spray device. Last, but not least, all unit humidifiers, whether of the fan and disk type or ductless central unit type, depend on a high air outlet velocity for distribution. This is as detrimental to the fermenting process of dough as lack of sufficient moisture.

It follows, therefore, that a combination of the best points of each of these units would make the most favorable system. Briefly stated, it should comprise a low-velocity, duct-distributed, small-volume capacity, 72 deg. F. water-spray type central unit, for introducing humidity only.

The main body of this type of apparatus should consist of a spray chamber, a set of eliminator plates sufficient to remove the excess moisture, and a heating element to remove the proper amount of moisture in order to obtain the required relative humidity. The spray water may be connected to the city water main, properly regulated with a pressure regulating valve so as to maintain a constant water pressure of 25 lb. at the nozzle outlet. Before entering the spray chamber, this spray water should be heated to 72 deg. F. by means of a double-pipe, steam-jacketed, thermostatic-controlled water line.

Jacket water should be controlled by means of a liquid-type thermostat with thermostat element in the water pipe and a controlled valve on the steam line to the jacket. Water discharge to the spray nozzle should be controlled by means of a thermostat element in a shallow water bath at the suction end of the humidifier. This limits the quantity of water flow through the spray nozzles. The same element is connected to a thermostatic valve on the dry heater which shuts off the steam to the heater as the percentage of humidity in the room increases, thereby obtaining a relative proportion between the water sprayed and the quantity evaporated. A constant relative humidity will result. The element located at the suction end of the humidifier is actuated by the wet bulb temperature of the air entering the humidifier from the dough room.

A multi-blade type fan is used to draw the humidified air from the apparatus and distribute it through a discharge duct, or ducts, throughout the entire dough room. Care should be taken that low outlet velocities and proper air distribution be obtained. If the dough room is irregular in shape, it is well to provide a return duct to the apparatus, thereby obtaining a positive air exchange throughout the entire room. The location of the supply or discharge duct should be at the ceiling level to lay



Proof-room interior showing temperature-regulating ducts, humidifier-line inlets, and ceiling exhaust outlets

gently a blanket of humidified air on the fermenting dough. A suction or return duct, if installed, should be located at the dough-trough level. Infiltrated summer heat and winter cold should be taken care of by direct heating and cooling coils.

Care should be taken in selecting temperature-control valves to select them of proper size. A valve that is too large causes sluggish action in the valve stem movement, and, as in valves of the steam type, too small a movement in an oversized valve will cause high-velocity steam to cut the valve seat.

The dough, after leaving the dough room, is deposited in a divider or scaling machine that divides the dough mass into loaves of predetermined weight by the volume method. From the divider the lumps of dough pass to the rounder, where they are rounded up and kneaded. From this rounding apparatus the dough balls generally enter a dry proofer, an apparatus which conveys them and gives them a resting period of from 9 to 12 min. They enter the molding machine which shapes each dough piece to its final shape, ready for panning.

The panning of molded loaves is done either by hand or machine, after the dough leaves the molding machine. These pans are then placed on the shelves of steel racks, which generally are about 70 in. long and 30 in. wide and contain approximately 10 shelves. Such racks may be of a floor rolling type or of a suspended trolley and track type. The loaves are then placed for the final rising of the molded loaf in a humidified, temperature-controlled inclosure called a proof room.

The proof room generally houses 12, 15, 18, or more racks of panned dough, in single, double, or triple rows, and has doors on either side to enable the flow of production to proceed from the molding machine to the oven in orderly fashion. Side walls of the proof box generally are made of glazed tile or of metal-protected insulation. Doors, too, should be made of a metal-protected insulation material properly guarded on both sides with angle bumpers. Space between doors or door jambs should be at least 6 in., unless otherwise governed by the construction of the bakery building. The proof box usually is 8 ft. high on the inside with its roof generally made of concrete, smoothly finished and painted, or of metal-protected insulating board.

Humidifying and air-conditioning of the proof box is done much the same as previously described for the dough room. However, the dry bulb temperature here maintained is between 90 and 100 deg. F. and the relative humidity 87 per cent. Since both temperature and humidity are above those in the bake shop, in which the proof room is located, it becomes necessary to heat all the air which is recirculated within the apparatus. As the entire areas of both fronts of the proof box consist of doors, which are frequently opened and are opposite each other, it is readily seen that a greater amount of air is recirculated per pound of dough at this stage than in the dough room. Also, since it is necessary to supply the entire heat for both infiltration and conduction losses within the humidifying apparatus, it is more profitable to induce the humidity by means of a direct steam spray than by the use of a warm water spray. Total heat in the steam used for humidifying will tend to help raise the final temperature of the proof box as long as enough dry heating surface is placed between the steam spray and the fan suction to obtain the final required temperature and humidity.

The humidifying apparatus usually is placed directly on top of the proof-box roof. A multi-blade fan draws the humidified air out of the humidifying apparatus and discharges it into a supply duct which has various outlets located between the door jambs, each outlet reaching through the roof, downward to the floor, and outward toward the doors. The branches of this last run should be perforated with holes, or should be slotted. The return outlets for this system should be located at the roof of the box, midway between the supply ducts. All return outlets should be connected to a common return duct and to the suction side of the apparatus. Care should be taken when these ducts are designed that a low velocity and especially a low outlet velocity be maintained in the duct work. It is also advisable to have a slight increase in velocity on the supply side over that on the suction side, thereby creating a slight outward pressure rather than an inward leakage, to prevent short-circuit of air through the open door to the suction inlet.

Control valves of the humidifying apparatus are located in the steam line supplying the dry heater, the bulb of which is located centrally within the proof box proper. The steam-spray control valve is located in the steam line directly adjoining the spray chamber, and its bulb is located in a water bath in the suction side of the apparatus. Process within this proof box is continuous during the baking period, for as fast as the properly proofed dough is removed to the ovens, it is replaced with new racks of dough from the molding machine.

Sugars Assume Greater Industrial Importance

By C. D. INGERSOLL

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THE exodus of food preparations from the home to the industrial plant during the past twenty years has given new significance to sugar. Bread, candy, pies, cake, syrups, jellies, preserves, and similar products have been bidding farewell to the kitchen range and going into specialized industrial hands.

The one common factor in these food products is their sugar constituent. Although the industrialist studies his product for quality, uniformity, and cost economy, it has been the writer's experience that the first commodity the industrialist accepts as standard and the last ingredient he studies for process control is sugar—the traditional commodity that sweetens his product.

Sugar is a generic term for a whole series of materials of closely related chemical composition; each is a substance of rather well-defined chemical activities and physical properties. Of particular importance to us is the fact that each individual type of sugar differs to a greater or lesser extent from the others in its properties such as activity toward acids and alkalis, heat resistance, sweetening power, and solubility. We have the further consideration that small variations in the impurities found in sugars, particularly beet and cane sugars, appear to cause abnormal differences of the sugars under such specialized examinations as the candy test of the confectioner and the turbidity test of the syrup and beverage manufacturer.

The baker, confectioner, canner, beverage manufacturer, or other food industrialist has his manufacturing and control problem in which an appreciation of the properties and quality of the sugar he is using or intending to use is of the utmost importance.

Further, with the prospect of sugar entering more broadly into the non-food field, it is evident that sugar will take on more of the aspects of a chemical and less those of a commodity. How, why, and what kind of sugar is being used in the leather, explosive, dye, plastic, rubber, and other non-food industries are pertinent questions. As yet literature on the subject is meager and as scattered as it is meager.

The history of cane sugar is so well known that we may quickly follow it through the beginnings of history along the banks of the Euphrates, through the Middle Ages along the Mediterranean with the Arabs, up into feudal Europe and England, and through more modern eras to America with Columbus. Its rapid spread and growth in the eighteenth and nineteenth centuries and during more recent years have resulted in world production figures that have gone up and up toward a peak of 18,000,000 long tons annually.

Cane sugar's closest rival, beet sugar, had its beginnings in France during the Napoleonic wars. At that time France was trying to establish a grape-sugar industry to utilize the surplus of grapes created by the destruction of her wine industry during the English blockade. Failure of the grape-sugar project to meet the emergency centered attention on the creation of a beet-sugar industry. Since that time the beet-sugar industry has come steadily forward until today over 10,000,000 long tons is produced annually throughout the world. Beet sugar has always ridden along with government assistance either directly in the form of a subsidy or indirectly in the form of a tariff impost on imported cane sugar.

Corn sugar has more recently come into prominence. Previous to 1882 it was available only in the form of a syrup of doubtful purity. Although a patent was issued in 1882 for the production of crystalline sugar, only in 1919 did the production of crystalline corn sugar commence on an industrial scale. The United States Government reports for 1929 show that 555,576 short tons of this sugar was produced in syrup form and 447,498 short tons in crystalline form.

The native American sugar is the maple sugar. Today it is a delicacy commanding a fancy price, on account of the highly prized maple flavor which it contains. Maple sugar was at one time the sugar of the New England kitchen and regarded as the future household sugar of America. Great hope was held that this sugar would supplant the slave-made sugar from the Indies, but unfortunately for the realization of this hope, its supply was found to be limited. Yet demand for it has been persistent, despite ever-increasing prices. Addition of cane sugar was a natural consequence and has been the subject of much investigation. Since 1890 the production of the sugar has fallen off considerably with the development of a tendency to produce and sell the commodity in the form of maple syrup rather than to crystallize out its sugar. This is logical, in view of the fact that the value of maple sugar or syrup lies principally in its non-sugar maple flavor; much of which is lost to the sugar in the crystallizing process.

Although the discovery of milk sugar dates back as far as, if not prior to, the discovery of beet sugar, its industrial value seems to be limited to the field of special diets and infant feeding. It has a low sweetening value and a relatively low solubility combined with a definite purgative effect. Since 1910-14 its production level has been approximately three to five million pounds per year. Perhaps this "level of usefulness" expresses the limitations placed on it by its peculiar properties.

Among the newer industrial sugars are malt sugar and invert sugar. Malt sugar is made from starch by the action of malt extract, while invert sugar is prepared from either cane or beet sugar by the action of acids or an enzyme called invertase.

Industrial Sugars

Group	Chemical Name	Commercial Name	Solubility Lb./100 Lb. Water at 68 Deg. F.	Solubility Lb./100 Lb. Water at 176 Deg. F.	Relative Sweetness	Per Cent Water of Crystallization
Tri-sugar ($C_6H_{12}O_6)_3$ —$2H_2O$	raffinose.	raffinose.	17 at 61°	.....	.....	15
Di-sugars ($C_6H_{12}O_6)_2$ —H_2O	sucrose.	cane sugar, beet sugar, maple sugar, date (palm) sugar.	204	362	100	none
	lactose.	milk sugar.	19	77 at 149 deg.	27	5.0
	maltose.	malt sugar.	77	318	60	5.0
Simple Sugars $C_6H_{12}O_6$	dextrose.	corn sugar, grape sugar, glucose.	91	436	50- 60	9.1
	levulose.	artichoke sugar, fruit sugar.	375	740 at 131 deg.	110–170	none
	invertose.	invert sugar.*	.....	.....	.....	.....
Special $C_5H_{10}O_5$	xylose	cottonseed sugar	117	.....	.....	none

*Invertase is not a true single sugar but is an equal mixture of the simple sugars dextrose and levulose obtained by the action of acids or invertase on sucrose.

Malt sugar finds some outlet in the confectionery, baking, and dietary food industries but seems to have the Eighteenth Amendment as its real present-day backer.

Invert sugar, on the other hand, has gone quite definitely into the baking, confectionery, and other fields with a real mission, due to its distinctly different physical properties and the power it gives the manufacturer to control the quality and consistency of his products. Statistics as to the extent of its use and production are not readily available, but indications are that it will continue to grow steadily.

Date (palm) sugar, true grape sugar, sorghum, skirret, and other lesser known sugars need not be discussed, as they have either passed into history or are of no industrial importance in the United States. Of more consequence are the three sugars that have appeared upon the industrial horizon during the past few years and may come into future importance. These sugars are levulose, xylose, and raffinose.

Levulose—artichoke sugar—is the sweetest and most soluble of all sugars and, because of these properties, should offer the manufacturer a distinct usefulness for many purposes. Also claim has been made that it is a sugar particularly adapted to diabetic diets. At present this sugar has gone through most of the early throes of industrial exploitation and now appears at a resting stage in the public mind. In this respect this sugar is more or less following the precedents set in the establishment of the beet and corn sugar industries and very possibly may need another 40 to 50 years to become available industrially. It is to be hoped the present accelerated means of development will shorten this period.

Raffinose is obtained as a byproduct from waste beet sugar liquors and has had some moderate public notice from time to time. It is at present a sugar with means and methods of production at hand but as yet no definite use for it has come to light.

During the past two years considerable publicity has been given xylose, a pentose obtained from cottonseed hulls, peanut shells, wheat bran, and similar cellulose materials. It was hoped that xylose would find extensive use among the confectioners and bakers in the making of candies and pastries that would be sweet but would not add avoirdupois to our American consumers of these products. However, American women seem content to prefer the products containing cane, beet, and corn sugars, from which confections are now made. In passing it is worth noting that xylose is not new to industry and that it has appeared for many years as a transitory intermediate product in the manufacture of furfural from oat hulls. In that process it is not isolated as a definite product.

The "grape sugar" of today is made from cornstarch instead of from grapes, as in the days of Napoleon. The term "grape sugar" has come to be a trade name for a certain type of glucose.

The most important industrial sugar markets are among the food industries, as would be expected. It seems probable that the percentage of sugar used in the preparation of industrial foods will increase rather than decrease. Different estimates of the major food industries vary somewhat; roughly, the percentages of sugar used by the five major divisions of the sugar-consuming industries are; bakers, 30 per cent; confectioners, 30 per cent; bottlers, 15 per cent; ice cream manufacturers, 15 per cent; canners, 6 per cent; and miscellaneous, 4 per cent.

The largest sugar user to date among the miscellaneous group is the meat packer.

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Report Canned Fishery Products for 1930

THE output of canned fishery products and byproducts in the United States and Alaska in 1930 was valued at $106,579,039, according to figures recently released by the Bureau of Fisheries. The $82,858,261 representing the value of primary canned products is 18 per cent below the 1929 figure. Value of byproducts remained about the same. Figures by states and by products are given in the following tables:

Canned Fishery Products and Byproducts By States, 1930

States	Canned Products	Byproducts *	Total
Maine	$5,617,085	$337,753	$5,954,838
Massachusetts, Rhode Island and Connecticut	1,713,291	3,161,910	4,875,201
New York and New Jersey	1,854,500	3,729,714	5,584,214
Pennsylvania	.....	346,762	346,762
Delaware	.....	637,322	637,322
Maryland	293,733	723,319	1,017,052
Virginia	354,873	1,443,925	1,798,798
North Carolina	148,419	350,129	498,548
South Carolina	633,115	189,635	822,750
Georgia and Florida	1,178,371	1,130,071	2,308,442
Alabama	259,696	46,774	306,470
Mississippi	1,639,767	293,776	1,933,543
Louisana	2,601,990	1,084,175	3,686,165
Texas and Wisconsin	494,186	46,235	540,421
Missouri, Illinois, Tennessee and Kentucky	.....	68,675	68,675
Iowa	.....	3,559,650	3,559,650
Washington	8,980,954	100,044	9,080,998
Oregon	4,792,784	28,280	4,821,064
California	22,351,816	4,379,102	26,730,918
Alaska	29,943,681	2,063,527	32,007,208
Total	82,858,261	23,720,778	106,579,039

*Including menhaden, fresh-water mussel-shell products, and marine pearl-shell products.

Canned Fishery Products and Byproducts By Commodities, 1930

Products	Number of Plants	Standard Cases	Pounds	Value
Canned products:				
Salmon—				
United States	45	1,054,001	50,592,048	$13,140,081
Alaska	149	5,032,478	241,558,944	29,695,872
Sardines—				
Maine	33	1,399,212	34,980,300	4,459,071
California	29	2,979,333	143,007,984	8,741,928
Tuna and tunalike fishes	15	2,010,640	48,255,360	13,055,876
Alewives	18	73,117	3,509,616	223,065
Alewife roe	34	60,367	2,897,616	303,559
Shad	14	12,245	587,760	42,190
Shad roe	10	3,339	160,272	69,579
Mackerel	15	109,322	5,247,456	396,027
Fish flakes	6	62,322	2,991,456	617,203
Fish cakes, balls, etc	9	122,281	5,869,488	1,003,501
Miscellaneous fish	16	23,369	1,121,712	117,900
Salmon eggs (for bait)	7	3,613	173,424	96,381
Sturgeon caviar	7	7,993	383,664	1,007,345
Whitefish roe and caviar	5	866	41,568	25,599
Miscellaneous roe and caviar	6	16,300	782,400	117,161
Oysters	48	396,174	5,942,610	1,836,862
Shrimp	69	818,491	13,482,492	4,960,542
Clam products	62	558,884	*14,003,012	2,666,045
Crabs	4	1,545	74,160	56,370
Miscellaneous shellfish	8	21,294	1,022,112	226,104
Total	†464	14,767,186	576,685,454	82,858,261
Byproducts:			Quantity	Value
Oyster-shell products (tons)			347,056	$2,595,252
Fresh-water mussel-shell products			.....	5,007,419
Marine pearl-shell products			.....	4,544,147
Scrap, meal, etc. (tons)			126,605	5,976,669
Marine animal oils (gal.)			14,704,784	4,200,064
Miscellaneous byproducts			.....	1,397,227
Total			.....	23,720,778
Grand total			.....	106,579,039

*"Cutout" or "Drained" weights of can contents are included for whole and minced clams, and gross can contents for chowder, soup, bouillon, broth, juice and cocktail.

†Exclusive of duplication.

Do Thermophilic Bacteria in Milk Rob Plate Counts of Meaning?

By H. A. HARDING
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The Mathews Co.
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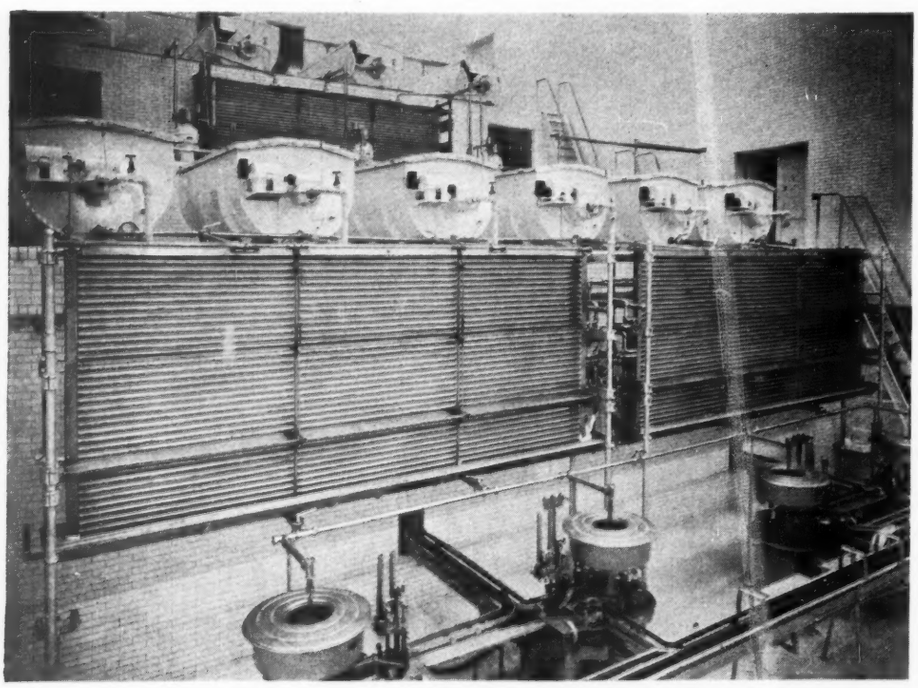
THOSE familiar with milk supervision appreciate the fact that milk inspection formerly was chiefly concerned to see that conditions of production and handling should appeal, so far as practicable, to the esthetic sense. The limiting factor in this attempt to have milk handled with attractive surroundings was the effect of these attractive surroundings upon the cost of the milk to the consumer.

Consideration of milk quality has been gradually added to the two earlier principles of esthetics and economics. As the consuming public is interested primarily in obtaining the highest quality milk supply which can be had at a given cost, it is evident that economics and milk quality are destined to become the dominant factors. Wherever there is provided, at a satisfactory price, a milk which shows an acceptable layer of cream, is safe with regard to the spread of infectious diseases, free from visible sediment, and which keeps in satisfactory condition during the period within which it is normally consumed in the household, the consumer will not be very solicitous regarding the frequency with which the dairy barn has been whitewashed or the square feet of window space per cow.

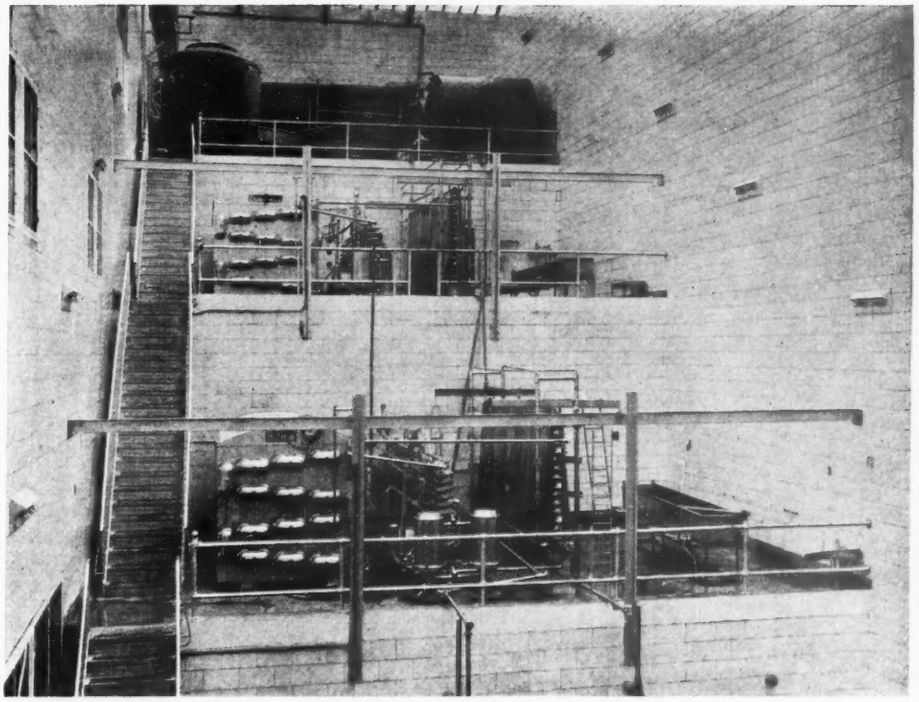
From the standpoint of milk inspection, however, it is not sufficient to recognize that a milk to be good must be rich, safe, clean, and sweet. It is also necessary that there be available reasonably accurate methods of determining these qualities.

In the case of keeping quality of the milk, the consumer is able to form a reasonably accurate estimate on the basis of experience in the household. Although the inspector has commonly pinned his faith to the results of the bacterial plate count, there is only a general relation between the bacterial counts obtained in the laboratory and the actual keeping quality of the milk. This is largely due to the fact that the acid-producing bacteria in milk develop rather poorly upon the standard medium prescribed by the standard methods for milk analysis of the American Public Health Association.

This lack of correlation between the bacterial plate counts and the keeping quality of milk has led to skepticism as to the desirability of the bacterial plate count as a means of judging quality of milk. Defense of this rather meaningless and expensive test as a standard in milk supervision rests primarily upon the lack of any other generally recognized test to measure the keeping quality of the milk. The old idea that the mere presence of bacteria in milk constitutes a menace to the health of the consumer also has contributed to its retention.



In this gravity-flow pasteurizing system, only one pumping, from the dump tank to the four 1,000-gal. refrigerated storage vats in the upper background, is necessary. Above the fillers and cappers are two 18,000-lb. regenerative tubular coolers



This long-flow tubular pasteurizing system has a proved capacity of 12,000 lb. per hr. The 30-min. holding period is secured by proper timing of the flow through the tubular holders

Into this disturbed situation has been injected the problem of the thermophilic bacteria in pasteurized milk. The recognition of thermophilic bacteria in pasteurized milk is one of the incidental byproducts of the World War, as it cut off the supply of Witte peptone and Liebig beef extract which had previously been a part of the standard medium used in enumerating bacteria in milk. The American compounds to which bacteriologists resorted in this emergency stimulated the growth of forms in the milk which usually had failed to appear upon the earlier medium.

This brought to light bacterial counts of pasteurized milk markedly in excess of what previously had been customary. Nine million bacteria per cubic centimeter was the highest official count of carefully pasteurized milk which came to our attention, but records of counts in excess of a million per cubic centimeter were not unusual. In cities where the milk ordinance prescribed that pasteurized milk must give an official bacterial plate count of less than 50,000 per cubic centimeter, these counts were rather disturbing.

Perhaps the most marked civic agitation resulting from these counts occurred at Kansas City, Mo. Here a group who were enthusiastically supporting the use of raw milk took advantage of these high counts of the pasteurized milk as an argument in their favor. Considerable confusion was caused also in the supervision of the milk supply of a large number of cities before the authorities became familiar with the presence of these thermophilic bacteria in the milk.

It has been known for many years that thermophilic bacteria are widely distributed in nature. They have been the object of considerable study in connection with the canning industry and to a less extent in connection with the development of corn silage. The recognition of their presence and development in connection with pasteurization of milk dates back only to about 1922. These milk bacteria find their best conditions for growth between 140 deg. and 150 deg. F.

Studies of milk-plant conditions also have shown forms which find temperature conditions in the milk regenerator, 110-120 deg. F., well adapted to their development. Although these bacteria are not able to grow at pasteurizing temperatures, they are able to survive an exposure of 30 min. at such temperatures, with the result that the bacterial plate count of the pasteurized milk is increased accordingly. In the consideration of dairy problems, these forms preferring temperatures of approximately 115 deg. F. are commonly referred to as heat-resistant bacteria, and those which thrive at the temperature of milk pasteurization are spoken of as "heat-loving," or thermophilic, bacteria.

The development of these bacterial colonies upon standard agar plates such as are used in milk supervision has revealed a perplexing irregularity regarding the appearance of such colonies upon the plates from any given supply. High-count outbreaks varying in length from a day to some weeks sometimes occurred at very irregular intervals. No satisfactory explanation for these outbreaks was found in connection with the details of plant management or with the character of the raw milk supply.

More recently, recourse has been had to direct microscopic examination of the pasteurized milk. It was found that under ordinary conditions the number of bacteria in the pasteurized milk increased fairly steadily with the duration of the operations of the day. When a pasteurizing apparatus has been in operation for five or more hours, the pasteurized milk commonly carries some millions of bacteria per cubic centimeter.

Microscopic examination of the pasteurizing apparatus shows that the film which forms on the apparatus, particularly upon the interior of the chambers where the milk is held at 142-145 deg. F. for 30 min. or more, is composed largely of bacterial growth. This suggests that the observed increase in bacterial content of the output as pasteurizing operations continue is due to the development of this germ life in the walls of the apparatus, accompanied by a passing over of increasing amounts of this growth into the milk itself. Under such conditions the holding compartments of the apparatus act as vast plates for the development of these

bacterial forms. Direct examination of the pasteurized product in milk plants in an area extending from Boston to western Texas has quite uniformly shown the presence of large numbers of bacteria in the pasteurized milk on practically every examination. As a matter of fact, there have been but a few exceptions to this among our examinations extending over approximately two years and we have been informed of but a limited number of other exceptions.

"It has now become generally recognized that there is no satisfactory basis for the older idea that the presence of mere numbers of bacteria in milk is a menace to health. The finding of these large numbers of bacteria in pasteurized milk, which is generally recognized as the safest milk, bids fair to destroy entirely the basis for bacterial plate count standards in city milk supervision."

Additional information regarding the problem may be obtained by applying the methylene-blue reductase test to the pasteurized milk. The reduction of the methylene blue in this test is the result of the physiological activity of the bacterial forms present. This test is commonly carried out at 100 deg. F. as a measure of the activity of the bacteria which grow at that temperature. When used to detect the presence of thermophilic bacteria in pasteurized milk, the test is carried out in the customary manner except that the sample of milk is held at 145 deg. F. and a layer of neutral oil is added to each tube to check the reabsorption of oxygen from the air.

Samples of pasteurized milk collected and tested at the beginning of operations for the day usually will remain blue for some hours. After the continuation of pasteurization operations for six or more hours, the interval before reduction of the methylene blue may be reduced to a matter of minutes. Some cases have been observed where it was as short as five minutes. Such correlation between the abundance of bacteria in the microscopic preparations and the rate of reduction of the methylene blue renders it practically certain that the bacteria observed in the milk are alive and physiologically active at 145 deg. Fahrenheit.

No very definite conclusions are justified regarding the sources from which these thermophilic bacteria enter the milk. They have been demonstrated to be present in small numbers at least in many samples of certified milk as well as in the ordinary milk supply as delivered to the pasteurizing plants. Until the development of the hot methylene-blue test, no satisfactory method was at hand for recognizing the presence in raw milk of varying numbers of thermophilic bacteria. Laboratory studies of the colonies which develop on agar plates indicate that about twenty different forms are represented, but that only a few of these forms commonly develop upon the standard agar plates. In order to bring about colony formation with the other forms it is necessary to alter the composition and the reaction of the culture medium or the temperature of the agar plates.

The direct microscopic examination of the milk makes it evident that large numbers of bacteria are practically always present in the pasteurized milk. The laboratory studies show the inability of many of the forms present to grow on the standard media. In the light of these facts the strange irregularity in the appearance of high counts from pasteurized milk appears to be due largely to chance variation in the kinds of thermophiles present in a given sample. The bacterial plate counts also are variable according to the portion of the operations of the day represented by the sample. The length of time the milk sample is held cold after pasteurization also has a marked effect upon the ability of the thermophiles to develop colonies upon the standard agar plates. Samples plated immediately after pasteurization and then held at 40 deg. F. for 24 hours and again plated gave only 10 per cent of the original bacterial plate count.

Under actual conditions of milk supervision, samples sometimes are collected at the milk plant and plated immediately, but more commonly the samples are collected from delivery wagons after the milk has remained in cold storage approximately 24 hr. Thus the futility of comparing bacterial plate counts made under such widely varying conditions is obvious.

From the standpoint of the healthfulness of the milk supply, no one has raised any objection to the presence of these thermophiles. For the most part they seem to be a division of the lactic-acid flora which is commonly recognized as being either harmless or positively beneficial, as in the case of buttermilk. The fact that pasteurized milk containing large numbers of these thermophiles is being used daily by millions of consumers with the best of results is in itself compelling proof that their presence is not harmful.

The ability of many of these thermophiles to produce acid would be objectionable commercially if the milk were held hot for a sufficiently long time. However, as soon as the milk passes over the cooler and its temperature is reduced to approximately 40 deg. F. it passes out of the growth range of this group of organisms and their continued presence in the milk appears to have little influence upon its commercial qualities.

It has now become generally recognized that there is no satisfactory basis for the older idea that the presence of mere numbers of bacteria in milk is a menace to health. The finding of these large numbers of bacteria in pasteurized milk, which is generally recognized as the safest milk, bids fair to destroy entirely the basis for bacterial-plate count standards in city milk supervision.

It is already generally recognized that the methylene-blue reductase test conducted at 100 deg. F. is quicker, more accurate, and more economically employed as a measure of the keeping quality of the raw milk supply. Unfortunately, this test is not directly applicable to the measurement of the keeping quality of the pasteurized milk. However, the simple device of holding bottles of milk at 70 deg. F. and noting the interval before they begin to show undesirable changes offers a promise of meeting the needs of city milk supervision at this point.

The experience of the last quarter of a century with large-scale pasteurization has made it plain that this treatment is the most important element in modern milk-supply protection. Until the recognition of thermophiles many thought of pasteurization as a process for destroying the bacteria in milk. It is now generally understood that its object is to make milk safe through the total destruction of any disease-producing bacteria that may be present. Properly pasteurized milk is safe milk even though, incidental to the process, the actual number of living bacteria in the milk is considerably increased.

How the Dollar Spent for Bread Is Sliced

A LITTLE less than 37c. of the consumer's bread dollar goes into cost of material, according to a study of the retail price of bread by the Wisconsin Department of Agriculture and Markets in Kenosha, Milwaukee, Madison, Janesville, Green Bay, Superior, and La Crosse for the calendar year 1930. Fourteen wholesale bakeries in the above named cities were visited for the purpose of gathering data pertaining to the cost of manufacture and distribution of bread. Information with reference to price paid and received by the retailer was secured by direct contact with 222 retail grocers.

About one-third of the cost of materials was for ingredients other than flours, leaving about 25 per cent of retail price as flour cost. During 1930 flour prices declined more than any of the other ingredients used in the manufacture of bread. The average price paid by Wisconsin bakeries for patent flour at the beginning of 1930 was $6.23 per barrel, whereas the average price paid for the same grade of flour during the latter part of December, 1930, was $4.58, a decline of $1.64 during the year on patent flours. The average price paid by Wisconsin wholesale bakers for clear flours during the early part of 1930 was $5.33 per barrel, whereas the price at which they were enabled to purchase the same grade of flour during the latter part of the year was $4.03 per barrel, showing a decline of $1.30 per barrel on clear flours. The general price trend on powdered skim milk and sweetened condensed skim milk during the year 1930 was downward. Powdered skim milk varied from 7½ to 8½c. per lb. at the start of the year and could be purchased at the close of the year for a price varying from 7¼ to 8c. per lb. Sweetened condensed skim milk showed a downward trend almost in line with that of powdered skim. Shortening, salt, sugar, and yeast, showed very little difference in price at the close of the year as compared with the start of the year.

Nearly 18c. out of every dollar spent for bread is used to meet the expenses incident to operating the manufacturing baker's shop. This includes such items as salaries and wages, janitor service, supplies, steam and fuel, light, power, ice, refrigeration, water, shop supplies of all kinds, repairs to building, machinery and oven; depreciation, and insurance. During 1930 these shop expenses remained almost constant. Considerable variance was found at different plants in the percentage of cost for shop operation.

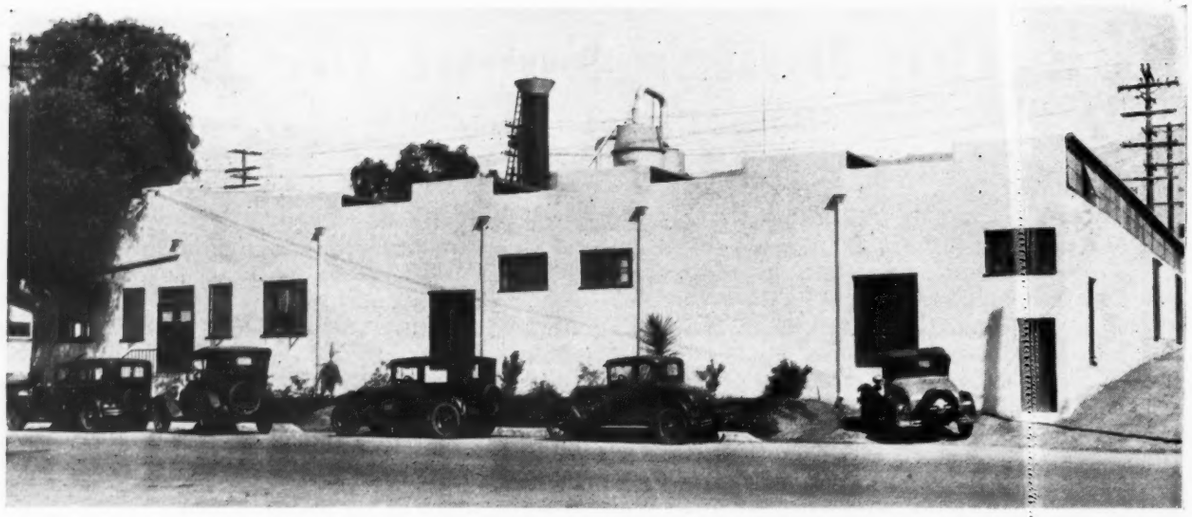
General and administrative expenses in the wholesale bakery business during 1930 amounted to over 5½c. of the consumer's bread dollar. Under the term general and administrative expense we are including such items as executive salaries, travel expense, office supplies, stationery and printing, postage, telephone and telegraph, legal, association and professional fees, insurance, taxes, and depreciation on office equipment. A wide variance in the amounts paid to the executives for salary was noted in the survey.

Nearly 20c. of the dollar which the consumer pays for bread is required to maintain the selling and delivery service by the wholesale baker. The highly competitive nature of the distribution of bread on the part of the wholesale baker makes it a very expensive proposition. A plant to be operated most effectively must be operated at or near capacity. In order to operate the plant to capacity, the wholesale bakers have found it necessary in some instances to expand their distribution service to rural communities beyond economic distribution limits. Some are distributing to points 80 miles from the point of baking.

After the wholesale baker has bought and paid for his materials, has operated his plant, has met the necessary items of administrative expense and has maintained his selling and delivery service, his profit averaged 2.795c. of the consumer's bread dollar, the survey revealed.

The final 17.56c. of the dollar goes to the retailer to operate his business, to meet his overhead and operating expenses, to take care of his delivery service, extend credit as required by the consumer, and to supply the retail profit.

Money spent for bread is divided in proportion to these slices



Plant of the California Vegetable Products Co., Burbank, Calif.

Dehydrating Vegetable Products

By MEL WHARTON
Los Angeles, Calif.

DEHYDRATED vegetable powders and flakes are manufactured by the California Vegetable Products Co., of Burbank, Calif. The flaked products are used mostly for food, and sold to restaurants, cafeterias, and packing houses. In addition to these three sources of distribution, the powdered dehydrated manufactures have a flourishing sale among pharmaceutical supply firms, which use them in medicinal or corrective preparations of various kinds. The factory products are sold into trade channels as follows: for flavoring, 65 per cent; as vegetables, 25 per cent; pharmaceutical, 10 per cent. The food industries, therefore, absorb 90 per cent of the concern's output valued at approximately $350,000 annually.

The factory, a single-story concrete structure, occupies a space 125x150 ft. at 228 Front Street, Burbank. This community is a suburb, about 10 miles northwest of the business section of Los Angeles, in the fertile San Fernando valley. The plant is within 100 ft. of the main-line Southern Pacific Railroad freight depot at Burbank, and otherwise is excellently placed for market shipment of manufactured and packed products.

San Fernando valley is the truck and dairy hinterland of Los Angeles. About 12 miles wide and 40 long, it is extensively and intensively cultivated to the crops necessary for cattle feed and to the fresh vegetables always in demand on the retail tables of the fresh stuffs markets of the California metropolis.

All green vegetables are trucked direct from farm to factory, where they are deposited at one of two traffic doors. Dehydrated products for delivery to destinations at places other than in the metropolitan Los Angeles district are shipped from the rail platform adjacent to the factory. Motor trucks commonly move the finished goods used in the Los Angeles district.

Twenty-six different vegetables or allied green stuffs, in addition to kelp, are processed at this dehydrator. Kelp is dehydrated for its chemical properties only. Chief among the raw products purchased by the plant are asparagus, alfalfa, beets, beet leaves, cabbage, carrots, cauliflower, celery, garlic, kale, lettuce, mint, parsley, okra, onion, rhubarb, spinach, tomato, turnip, watercress, chili, and pimento. Of these chili, pimento, onions, garlic, and celery are powdered and sold for seasoning purposes.

During the past twelve months the company has processed 280,000 lb. of garlic, 1,100,000 lb. of onions, and 400,000 lb. of chili beans. An average of 3,500,000 lb. of raw vegetables are mechanically dehydrated at the plant annually. The value of the finished products is approximately $350,000. Plant and machinery have a value of $150,000.

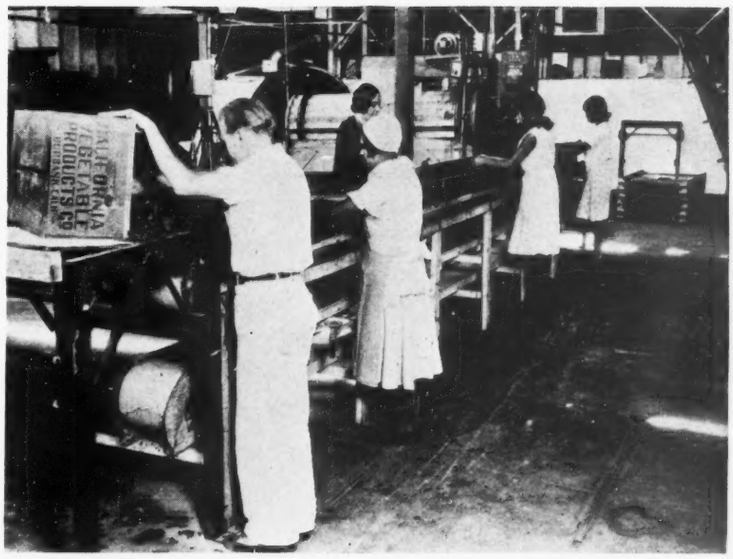
The processes used are highly mechanized, a factor making for economic operation. All moving machinery is electrically powered. As soon as raw materials are delivered to the concrete floor of the factory by motor truck their mechanical journey commences. The plant is laid out for straight-line production, one process following the other with a minimum in space and time-labor elements.

Some few raw materials, such as spinach, onions, and tomatoes, require pre-preparation, or selection, before they proceed through the plant. This is necessary to remove defects or imperfections in the raw vegetables such as might render them unwholesome. No products are permitted to enter the process which would not be readily salable in a fresh state on the open market. Such raw materials as okra, garlic, parsley, mint, and alfalfa require no pre-processing. Mint is used chiefly by the trade for flavoring, while the alfalfa goes into pharmaceutical channels.

Preliminary selection is done at three conveyor-type tables; each table is 24 ft. long and served with a rubber belt of the same length, having a width of 18 in. Below the top belt, from which the workers pluck the culls, is a rubber belt, 12 in. wide, running in the opposite direction to the top belt. The employees at the table pick out the imperfect vegetables and culls, dropping them onto the lower belt, which returns the unfit materials to a receptacle at the end. These "imperfects" are immediately emptied into a sewer. The top belt has four speeds, enabling the operator to accommodate belt travel

to the kind of vegetables being processed, as well as to the number of workers at the picking table. The speeds are 10, 25, 50, and 100 ft. per min., obtained by means of a gear speed reducer. A ¾-hp. motor is used for each of the sorting-table conveyors.

The selected vegetables, or those not needing pre-preparation, are then sent through a water conveyor and washer. This washer is constructed of rust-resisting metal, is 3 ft. in diameter by 9 ft. in length, gently sloped from the intake toward the output end. The metal is deeply corrugated, with corrugations 6 in. between valleys. Through the length of the washer, at the bottom of each valley is a chain of ½-in. diameter holes spaced ½ in. apart, to allow for drainage. Near the top of the inside of the cylinder is a ¾-in. diameter water pipe with pinholes, allowing the water to spray over the material on its way through the center of the cylinder, thoroughly washing the vegetables as they tumble about. A 2-hp. motor operates the washer, chain drive being employed.



Conveyor table used in sorting and culling certain raw vegetables. Cylindrical washer in background

One of four dehydrators, each capable of holding 21 trucks of 14 trays each

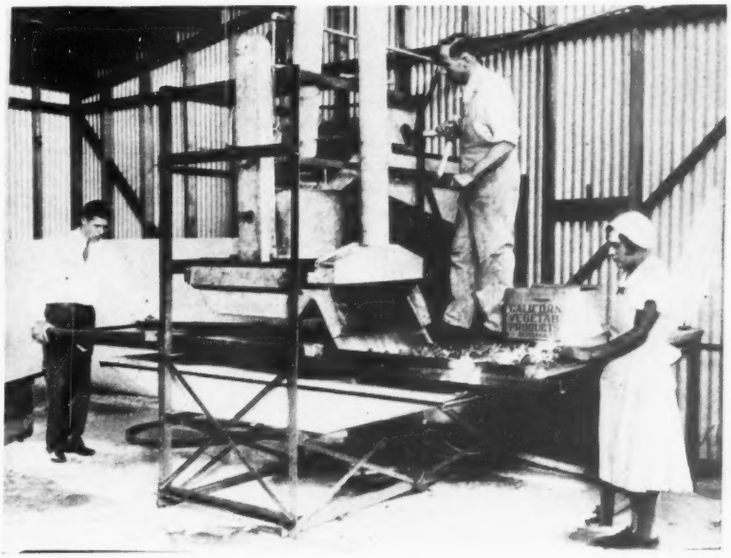
Most of the raw vegetables are cut up before being admitted to the oven tunnels for heat-treatment. The cutting apparatus consists of a water soak situated at the top of the machine from which the vegetables are fed to the cutting knives. This soak is made of galvanized metal and has a capacity of 50 gal. It feeds directly to a mesh-wire paddle-wheel inductor, hand-operated. After passing the inductor, the vegetables pass uniformly through a revolving cutter consisting of a Monel metal disk 24 in. in diameter set with five blades that can be adjusted to any desired pitch. The disk revolves horizontally at 700 r.p.m. Two sprays from ¾-in. water pipes are placed directly above the cutting disk, which is shielded by a circular sheet of metal.

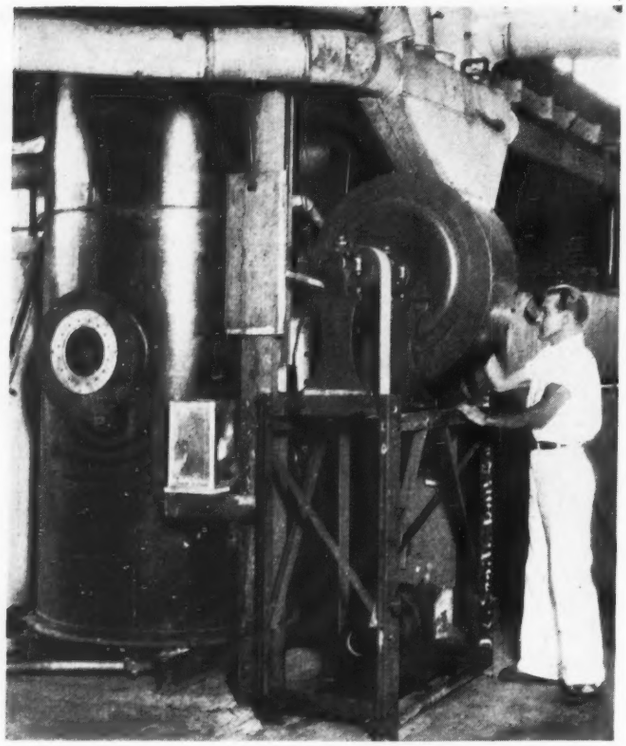
These sprays further wash the raw materials in process. The vegetables, coming through the cutter, fall in the presence of water on metal screen trays and in this manner are taken directly onto car-type trucks for delivery to the ovens. The cutter is operated by a 5-hp. motor; the water pump for delivering water to the soak and sprays, by a 2-hp. electric motor.

The plant has four dehydrators, each holding 21 trucks of fourteen trays each. Each tray measures 3x4 ft. in flat surface. Every dehydrator is 32 ft. long, 10 ft. wide, and 6 ft. high, and is built of galvanized metal. Between the metal walls is an asbestos filler, as well as air insulation. Heat is generated by gas retorts placed under each dehydrator. The ovens have three sliding, nearly vertical, doors fitted with counterweights. The tunnels are supplied by 40-in. diameter fans that give an air velocity of 750 lin.ft. per min. The fans are powered by 7½-hp. motors. The 24-hour capacity of the four dehydrators is 20,000 lb. of fresh products.

Because of the relatively large poundage of vegetables such as onions and garlic processed at the California

Cutting machine in which vegetables are prepared for dehydration





Fume arrestor used when dehydrating such vegetables as onions and garlic

Vegetable Products Co. plant, it has been necessary, in compliance with local requirements, to install a fume arrestor. This arrestor effectively eliminates odor nuisance, with the result that no complaints have been registered against the firm's continuance at its present location. Each tunnel is served with ventilator pipes that have suction fans connected. This system functions by pulling off the heavy odors into a vertical iron tube 4 ft. in diameter and 40 ft. high. Inside the tube is a series of 48 spray heads served by a ½-in. diameter pipe. The sprays extend from top to bottom of the tube. One hundred and twenty gallons of water is forced through the sprays each minute, saturating the gases that enter, so that they emerge without objectionable odor.

Inasmuch as approximately 30 per cent of the plant's output is in powdered form, the factory employs two hammer mills for pulverizing purposes. The smaller mill has a capacity of 1,000 lb. of powdered dehydrated products each eight hours. Through a hopper the dehydrated material is fed onto a series of small metal hammers revolving at 4,800 r.p.m. A driving fan forces the powdered material, which has received high velocity, due to the rapidly whirling hammers, up through a metal tube to a "cyclone" which reduces this velocity. The speed of the air as it leaves the fan is between 800 and 1,200 ft. per min. From the cyclone the powder drops through a cloth tube onto the surface of a Rotex shaker screen, which further perfects the division of particles, many of which have become mashed together to form mats. A 3-hp. motor operates the hammer mill, with a ½-hp. motor for the shaking screen.

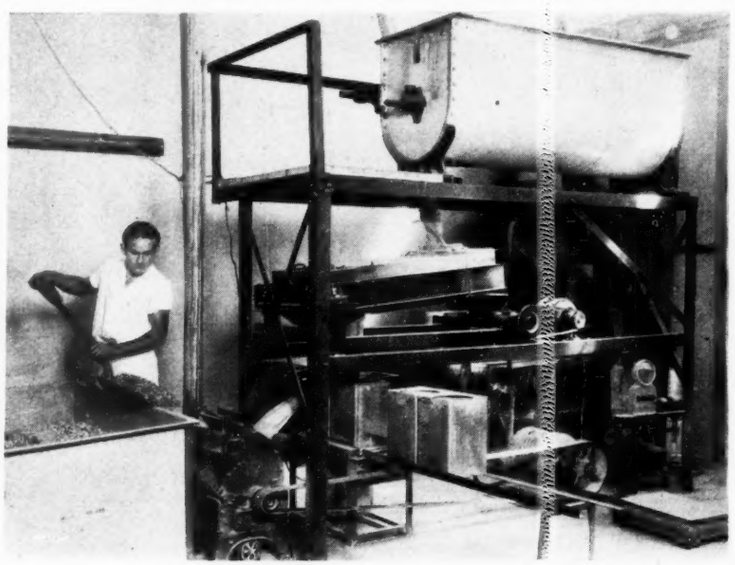
A larger powder mill has a rated capacity of 1,000 lb. each hour. A 20-hp. motor is used for furnishing the pulverizing power to this machine. In both mills, the powdered products are discharged into 5-gal. tinned metal containers in which they are delivered to the packing room for labeling and packing for shipment.

Vegetables not powdered are flaked. Material to be so processed is first fed into an overhead hopper and onto the fast-revolving blades of a mill having cutting contacts much like a common lawn mower. Each blade is 24 in. long and there are four in the mill. These revolve at about 700 r.p.m. The cut or flaked product drops onto a shaker screen, dropping, according to size, through one of two chutes, into bags. The smaller flakes pass through the flat agitated screen, the larger ones passing over it. Thus the screen automatically grades the flakes into two sizes. By varying the screen sizes, nearly any size flake may be obtained.

Most of the finished products, both powdered and flaked, are packed in 5-gal. tins. The exceptions to this packing rule are some powders and flakes for pharmaceuticals, and sample packages. The plant also mixes a soup vegetable stock consisting of nine kinds of vegetables, which is supplied chiefly to restaurants. The tins are soldered, then further sealed with paraffin. Two tins are customarily shipped in one fiber carton. During the several years this packing system has been in vogue there has not been a single tin returned on account of damage in transit.

Thus far the California Vegetable Products Co. has never attempted retail sales promotion or distribution of its various manufactured items to the retail trade. It has been content to exploit them among the packers, pharmaceutical houses, and food dispensing organizations. There is now, however, a desire to experiment with the retail field. Plans are being made by plant executives to develop the retail business in order to increase production. The company believes that the excellence of its products will meet with favor by the public, once the public is acquainted with the economies often found in dehydrated foods. If the pending exploitation is successful, further mechanization of the plant will be the order, since it has permitted efficiencies, speed of production, cleanliness, and economies in the company's present modern factory. During rush season, the Burbank dehydrator employs 50 persons. There is seldom a week when some vegetables are not being processed.

Hammer mill, hopper, and screen used in powdering dehydrated vegetables. Cyclone at roof level is not shown



Treating Raw Canning Products With Ethylene*

By E. M. CHACE
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Laboratory of Fruit and Vegetable Chemistry
U. S. Department of Agriculture
Washington, D. C.

SINCE Dr. Denny received his public service patent covering the ethylene process, eight years devoted to both scientific and practical experiments have passed; but we are at this time faced by the fact that by far the largest use of ethylene for treating fruits and vegetables is in the citrus industry.

Denny[1] called attention to the enormous increase in respiration caused by ethylene when used on oranges or lemons, and realized the necessity for ventilation during the time the fruit was undergoing treatment. It has been difficult to convince packers of this need, and even now many of the packing houses are without adequate means of changing the air in the coloring rooms. A number, however, have installed forced-draft systems and readily see that increased efficiency results.

Poor ventilation usually is accompanied by poor circulation within the rooms. Often boxes are placed too close together, rows are staggered, and the top boxes are too near the ceilings. In most of the California districts, heat is necessary in the coloring rooms during part of the year, and usually the non-glow type of electric space heater is used.

Where cold fruit is brought into the rooms and the stacks of boxes are placed in contact with cement floors, the bottom boxes are heated very slowly. After 48 hr., differences in temperature between the bottom and top boxes as high as 20 deg. F. are often found. Under such conditions, uniform coloring is impossible. The optimum temperature for oranges is 75-80 deg. F., and satisfactory coloring cannot be obtained where the temperature is below 65 or above 90 deg. F. Where the circulation is poor, the hot air collects at the top of the room. This stratum contains most of the ethylene, and the combination of gas and uneven distribution of heat causes bleaching out of the top boxes, giving a lemonlike color and very slow coloring of the bottom boxes.

The questions presented to canners when considering the usefulness of the ethylene process in their field differ somewhat from those which confronted the citrus packers when the method was offered to them.

Few if any canners are equipped to carry out large-scale experiments. Gas-tight rooms, each with a capacity sufficient for a half day's run, would have to be installed.

Moreover, change of color, which is the chief benefit to be derived from the use of ethylene on fresh fruit for the market, is not nearly so important with the raw product for canning. Color, as a rule, is not so important as uniform texture. If the sole effect was to deepen the color, the process would have little application in the cannery, but the production of uniform color and texture is an advantage not to be overlooked.

Another question which arises is the concealment of inferiority by the method. The question is readily answered in the case of citrus fruits. Coloring the immature fruit is prohibited by law and, moreover, a satisfactory color can rarely be obtained on very immature fruit. With tomatoes the problem is quite different, for there is little advantage gained in treating the nearly mature fruit. The immature fruit is lacking in vitamin C, which the mature fruit contains in abundance.

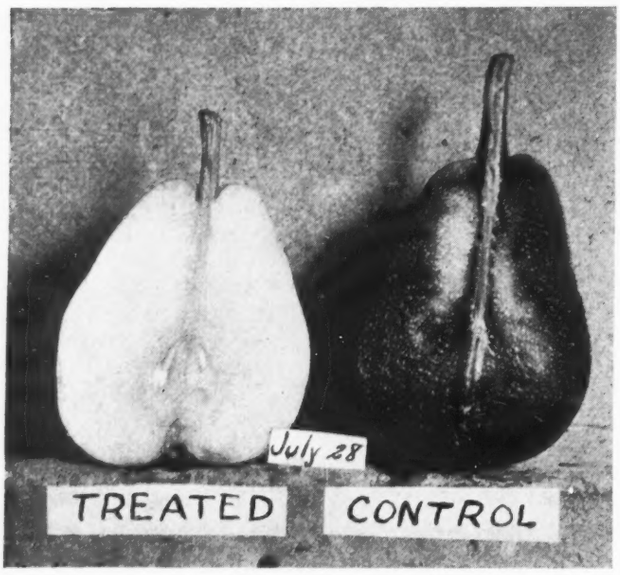
Tomatoes—In considering specific raw products where ethylene might possibly be used with some benefit, tomatoes probably are the product canned in greatest quantity and should be discussed first. From the investigations already published, it is difficult to draw conclusions as to the effectiveness of the treatment when applied to tomatoes. There seems to be a change in color if the tomatoes are harvested at what is termed the "green-ripe" stage, this change taking place in about one-half the time that it would require without the treatment.

Certainly no one would advocate the harvesting of tomatoes for canning at this stage, however. The product is cheap, and it would seem more practical to pick it when mature and discard any fruits too green for canning. Unless very carefully handled, mold and rot would develop rapidly in the bruised or broken specimens. Taking

Testing the degree of softening of pears after being treated with ethylene

*Food Research Division Contribution No. 107.

[1]Denny, F. E.: "Effect of etheylene upon the respiration of lemons." *Botanical Gazette*, May, 1924, Vol. 77, No. 3, pp. 322-329.



Starch disappears from pears after ethylene treatment (starch stained with iodine)

these facts into consideration, it is difficult to see the advantage to be gained by treating tomatoes for canning with ethylene.

Pears—The situation in the case of pears is somewhat different. This fruit is always harvested while quite hard, and artificially softened before canning. There are good reasons, of course, for such procedure. If the fruit is allowed to soften on the tree, it could not be transported without serious bruising, and the resulting heavy trimming would be both unsightly and expensive. The flavor of the tree-ripened fruit is inferior to that softened in storage, and the risk of loss from decay would be greatly increased.

Pears contain starch, a reserve sugar-forming material, which is converted into sugars during the storage period. Owing to the conversion of this starch, the fruit is sweeter after storage than when harvested. Moreover, this fruit is not considered a good source of vitamins, so that the question of the vitamin content at the time of harvesting is not so important as it is in the case of tomatoes.

Many canneries consider the texture of pears of more importance than the color, and ethylene affects the texture to a greater extent than it does the color. The treatment will soften pears in about five to six days, and very often the fruit does not require a preliminary sorting before going to the preparation tables. Where the usual storage is turning out fruit in the same length of time, there is little if any advantage in using the gas. Where fruit is being stored for a period of ten days or over, and has to be sorted several times, ethylene will save both time and labor.

If possible, the temperature in the coloring rooms should be kept between 75 and 80 deg. F. Temperatures over 90 deg. F. slow down the treatment to no small degree. Humidity can be quite high without detriment, but plenty of ventilation will be found desirable. So far as we have been able to discover, there is no difference in quality between the treated and untreated fruit after canning. Stone cells seem not to be affected by the treatment.

In comparing the ethylene-treated fruit with controls, the latter should be stored in the pear cellar, or rooms containing fruit and not merely set aside or placed in a tight closet. Fruit stored in considerable quantities will soften sooner than a few boxes of the same material stored alone. It would seem, therefore, that the gases from ripening fruit probably have the property of softening and coloring similar to ethylene. Ethylene, of course, is not the only reagent which can be used; chloroform and some other compounds will cause similar changes.

Stone Fruits—At first thought it might seem impossible to utilize ethylene on fruits of this type where decay is so great a problem. As they have no sugar-forming reserve material, they are harvested as near to the time of canning as possible, for they never gain in sweetness after harvesting.

Ethylene cannot be satisfactorily used with peaches or apricots, except on types that do not naturally soften uniformly. Some varieties of apricots color and soften on one side while the other remains light-colored and quite hard. This fact makes them very poor canning stock where otherwise they would do well, being large and well-colored. If such varieties are harvested somewhat before they reach the usual canning stage and are treated with ethylene for 48 hours, they soften and color uniformly with very little loss from decay or from pie-stock grades.

In operating on either peaches or apricots, the temperature should be kept around 75 to 80 deg. F., if possible, and the humidity as low as possible, in order to keep down mold and decay, but not so low as to shrivel the fruit. Plenty of ventilation, of course, is desirable.

There seems no possibility of utilizing the process on cherries. Our experiments with the Royal Anne variety gave us little encouragement. There was no increase in color on the red side and but a slight change from greenish white to yellow on the other.

Some investigators have tried to darken the red color found in prunes from some districts by ethylene treatment. As the desired shade is black, lighter shades are undesirable, and as there seems no reason to suppose that the fruit is not equal in quality, it does not seem objectionable to bring about a color change. So far, however, little headway has been made toward solving the problem, which is of minor importance to the canning industry.

A limited experience with apples leads us to believe that ethylene may have some effect on the yellow green colors, but little or none on the reds. Just what advantage the process could have as a pretreatment for canning apples is not apparent.

Pineapples are not canned in this country, and little is known of the possibility of using the process as a pretreatment with them. One investigator working on four fruits found an increase in the enzyme activity after treatment. It is not apparent, however, how such a phenomenon would affect the canning quality.

In all probability a large quantity of grapefruit which has undergone ethylene treatment has been used for canning, but there is nothing in the literature which shows any investigation of the effect. Work done in this laboratory tends to give weight to the opinion that the pectinous constituents of citrus fruits are not benefited by the ethylene process. But the effect is slight and would hardly be noticed in canned grapefruit.

It appears at present that ethylene as a pretreatment for fruit for commercial canning has a very limited use. Under some conditions it might be profitably used on pears. Its use with apricots is limited to specific varieties which are grown only to a very limited extent. With other fruits and vegetables there seems little chance of developing practical uses for it.

Japan as a Market For American Foods

By WALTER BUCHLER
London, England

THE balance between food and population is one of Japan's most pressing problems. Population is now approximately 65,000,000 and increases every year by about a million. Being a mountainous country, Japan has a limited area for cultivation, and therefore her production of cereals is restricted. Even the production of rice, which forms the greatest of her crops and is the principal food of the people, is insufficient to meet her needs, and large quantities have to be imported from Indo-China, Siam, Kwantung Leased Province, and India.

Although rice is still the most popular food in the dietary of the average Japanese, bread and other foodstuffs containing wheat flour are becoming more and more customary as part of the every-day meal not only in the towns where westernization has a firm hold but in every village and hamlet. The demand for wheat from overseas, therefore, is bound to increase in spite of the intensive efforts of the Japanese Government to encourage farmers to grow more of it, for Japan is but a small country and every inch of ground is cultivated where practicable and profitable.

The increasing consumption of wheat flour in Japan has led to the development of an important milling industry. There are in the country about 550 factories engaged in polishing cereals and flour milling, foreign machines being used in the larger mills. The latter are equipped with the most up-to-date machinery, most of which is imported. Imports of wheat, wheat flour, and other cereal products into Japan during recent years are shown in Table II, on the following page.

The United States, Canada, and Australia are Japan's principal sources of wheat. Although there has been considerable fluctuation, Canada has supplied the greatest share in recent years (see Table I).

The canning industry has shown remarkable development in Japan, but it has not been able to keep pace either with the demand or the preference on the part of the people for better-quality merchandise. For instance, Japanese condensed milk is as good to the taste as that imported, but its keeping qualities are inferior. In a climate like that of Japan, it tends to thicken more quickly than American products. Most of the canned milk imported comes from the United States.

The possibilities this field offers for the sale of such products seem such as to warrant other American firms entering this market. But it must be fully realized that, to get a real footing there, it is necessary to open one's own branch in Japan, organize a complete sales department, and spend large sums of money on advertising through the press and other media. To develop a business through the usual export channels does not give concentration enough to meet the competition from the few already in the field.

Table I—Percentage of Wheat Imports Coming From The United States, Canada and Australia

	1927	1928	1929	1930
United States	33.6	22.4	21.2	36.1
Canada	37.0	46.8	49.7	....
Australia	25.9	14.3	21.8	....

In some respects the Japanese people are not so particular about quality, and qualities which would be rejected here and in other markets are salable in Japan. Japanese dealers, however, are ever anxious to find fault with merchandise supplied, to enable them to make a claim and add to their profits. All shipments, therefore, should be carefully examined prior to shipment, and only a uniform quality dispatched.

Total imports of condensed and dried milks into Japan are shown in the following table:

		1927	1925	1924	1930
Condensed	In 1,000 lb.	7,840	8,410	8,940	8,395
	In $1,000	1,165	1,070	1,110	1,012
Dried	In 1,000 lb.	1,670	1,770	1,960	1,610
	In $1,000	610	696	726	602

Despite the typical oriental appearance of many of the interior towns, American products can be found on sale

R. Moulin—Ewing Galloway, N. Y.

Table II—Imports of Wheat and Other Cereal Products Into Japan

	1927		1928		1929		1930	
	Quantity (In 1,000 lb.)	Value (In $1,000)	Quantity (In 1,000 lb.)	Value (In $1,000)	Quantity (In 1,000 lb.)	Value (In $1,000)	Quantity (In 1,000 lb.)	Value (In $1,000)
Wheat	1,029,000	25,550	1,450,000	31,450	1,620,000	32,650	1,065,000*	20,501
Wheat flour	44,000	1,359	18,300	550	15,400	449	42,900	1,112
Tapioca and manioca	29,000	770	45,100	1,071	37,200	971	16,600	405
Cornstarch	14,600	479	17,300	598	17,500	648	17,200	589

*17,776,339 bu.

Exports of condensed milk to Japan from the United States in 1930 totaled 4,219,000 lb., valued at $779,000; evaporated milk totaled 3,261,225 lb., valued at $276,632.

Some excellent butter is made in Japan, especially in the Hokkaido, or north island, the agricultural center of the country. So far, the supply has not been sufficient to meet the demand, and it is unlikely that the import market for such products will fall off entirely even in the future. The reason for this lies in the fact that more and more Japanese prefer foreign butter to that made locally. Given sufficient stimulus backed up by appropriate advertising, there is no reason why American butter should not find an ever larger sale in this market. Sales of American butter in Japan in 1929 amounted to 38,571 lb., as against 31,686 lb. in the preceding year. Total imports of natural butter into Japan in recent years were as follows:

Year	Volume (pounds)	Year	Volume (pounds)
1927	719,000	1929	509,000
1928	432,000	1930	610,000

Owing to the heavy import tariff on confectionery in Japan, the sale of such products is limited. The principal outlet is for cocoa, cacao beans, and chocolate coatings for use in making candy among the smaller manufacturers. There are a large number of these manufacturers in Japan, as practically every store selling candy makes some particular kind of its own.

Confectionery and jams valued at $65,500 were imported last year, compared with $70,000 the previous year. Cocoa imports in 1930 cost $326,500, compared to $226,000 in 1929, and $213,000 in 1928.

Beverage cocoa and coffee are becoming increasingly popular among all classes of Japanese. They are sold at all grocery stores, cocoa being stocked also in the better class confectioners. As beverages, they are now obtainable at practically every restaurant in the larger cities of Japan. Coffee imports have been rising steadily in volume, as follows:

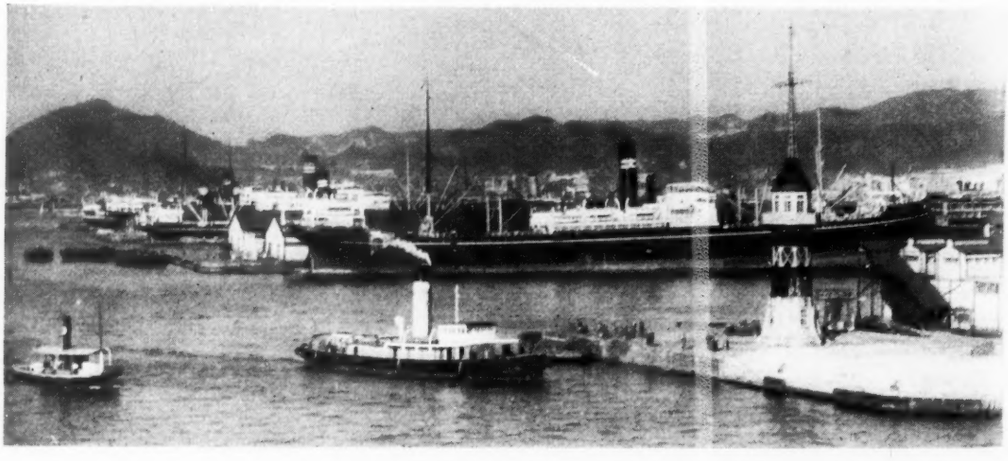
Year	Volume (pounds)	Year	Volume (pounds)
1927	2,790,000	1929	3,940,000
1928	2,965,000	1930	4,159,000

In such cities as Tokyo, Yokohama, Nagoya, and many others there are few among the better-class grocery stores which do not stock a fair quantity of American dried fruits, canned meat products, and canned vegetables and soups.

The same preference is extended to imported fruit juices, the local product being much inferior to those imported. The latter are cheaper and are made from imported essences mixed in Japan. Meeting the needs of those Japanese unable to afford the better brands of juices, they have created a fair market for all kinds of imported essences.

There are several courses open to merchants and manufacturers who wish to enter the Japanese market. The simplest and least expensive is to appoint a foreign firm already established in Japan as agent. Although the number of foreign firms in Kobe, Osaka, Yokohama, and Tokyo (which are the most important trading centers in this market) are comparatively few in comparison with the number in China, considerable business can be done through their agency. This is particularly advisable where stocks have to be kept on the spot, as in the case of canned goods and groceries in general. Larger firms may find it advisable to open their own branches, preferably in Tokyo, Yokohama, Osaka, or Kobe, and arrange sub-agencies in all the more important centers. When organizing one's own branch in Japan it is necessary to employ the services of a "Banto." His task is to introduce customers; arrange details, contracts, and the like, besides doing the interpreting. A "Banto" must be well connected with the trade and thoroughly familiar with the lines handled. A great deal depends on the selection of the right man, and it is generally advisable to bond him or get him to bond himself as a precaution against fraud and the like.

Should an American firm decide to deal directly with Japanese importers, both large and small, it is advisable to pursue a most conservative policy of trading, insisting that payments be arranged in the usual way by letter of credit being opened against all orders. The Japanese are in a position to do this and generally are willing to do so. It is advisable to restrict one's business to those Japanese firms who conform to customary export terms rather than to trade with anybody and hope for the best. Whatever course of business is decided on, the market in Japan should not be neglected, as it offers an excellent field for both the large and small organization.



The waterfront at Kobe, rival of Yokohama and Nagasaki for the honors of chief seaport

R. Moulin—Ewing Galloway, N. Y.

What "Power Factor" Really Means

By HENDLEY N. BLACKMON
General Engineer
Westinghouse Electric & Mfg. Co.

STRANGELY enough, the basic principle of power factor has quite a bit in common with the old mule-powered canal boat that was common back in the days before the term "power factor" had even been thought of. As Fig. 1 shows, such a towboat can never get a full mule-power out of the beast on the towpath, because the mule has a "low power factor" with respect to the boat.

Suppose the mule is walking quite a distance from the edge of the canal. The simple diagram of forces acting on the boat (Fig. 1-a) shows that a large part of the mule's effort tends to pull the barge toward the bank, instead of to its destination. The rudder of the boat must offset this bankwise pull of the towrope to keep the boat in the middle of the stream and, in so doing, waste a considerable part of the energy. Power factor is analogous to the measure of useful work transmitted from the mule on the towpath to the boat on the canal.

If the mule walks close to the edge of the canal, and puts forth the same effort, we naturally gain useful work. As in Fig. 1-b, the pull of the towrope is more in line with the load, so the "power factor" is raised; a smaller portion of the mule-power is spent tending to pull the barge shoreward. Increasing the useful effect of the mule's effort in this way is something like raising the electrical power factor in your plant. If it were possible to have an overhead towpath directly in front of the towboat, then all the mule's effort would be useful; this would correspond to 100 per cent power factor in an electrical circuit.

With a mule on both banks, as in Fig. 1-c, the shoreward tendency is nullified, and the second mule also helps pull the boat. This condition is analogous to adding a synchronous motor to an electrical circuit with poor power factor, thereby correcting the power factor while mechanically driving a crusher, or some other machine.

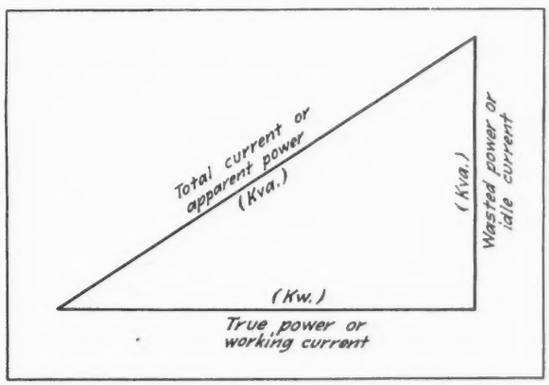
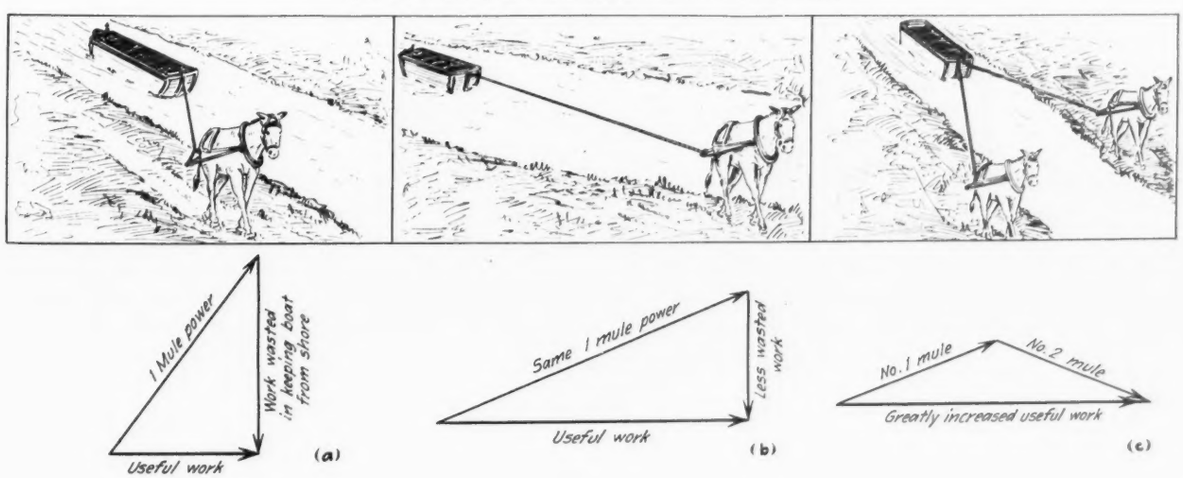


Fig. 2—As power is proportional to current flowing, power factor can be determined from a right-angle triangle whose sides represent total current, idle current and that which does useful work

After all, power factor is merely a measure of the "loafing current" in an electrical circuit. As power is proportional to the current flowing, the power factor can be determined by constructing a right-angle triangle (Fig. 2), whose sides represent the total current flowing, the idle current, and that which does useful work.

The power factor at any point in the plant can be found by comparing the product of the voltmeter and ammeter readings with that of a wattmeter connected at the same place and expressed in the following equation:

Fig. 1—Like the angular pull of the mule, a large power-factor angle (low power factor) means waste



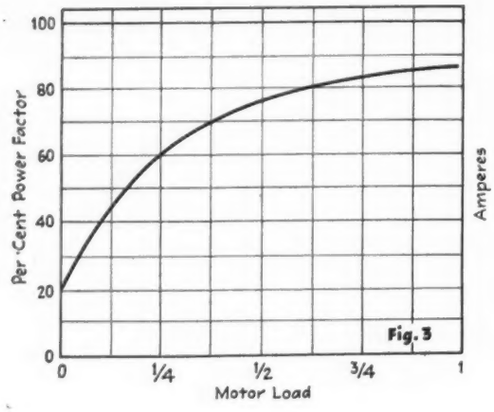
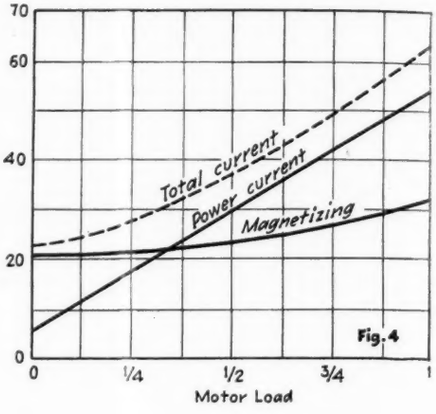


Fig. 3—Power factor of an induction motor rises as the load increases

Fig. 4—At light load, the "idle" (magnetizing) current of an induction motor is larger than the power current



$$\text{P.F.} = \frac{\text{Wattmeter Reading}}{\text{Product of Volts} \times \text{Amp.}} = \frac{\text{True Power}}{\text{Apparent Power}} = \frac{\text{kw.}}{\text{kva.}}$$

For three-phase current, the product of volts times amperes must be multiplied by 1.73 to give total kva., or apparent power.

Since power factor is nothing more than the ratio between true power and apparent power, it is expressed in per cent. Thus, 80 per cent power factor means that 80 per cent of the apparent power (hypotenuse of the triangle) is doing useful work, as shown by the "in-phase component" of the energy (base of the triangle). This numerical ratio (0.8) between base and hypotenuse corresponds to a 36-deg. angle. Trigonometric tables, under cosines, list the angle corresponding to any numerical ratio.

In the early days of the electrical industry, when almost all of the a.c. power generated was used for lighting, there was no power factor problem. Incandescent lamps have 100 per cent power factor. When the induction motor became the dominant electric power load, however, the problem became serious. Today, underloaded induction motors are the chief cause of low power factor in food-product plants.

The interaction of magnetic forces inside an induction motor gives it the ability to do work. Current feeding the motor splits to do two jobs; one part sets up the magnetic fields, and the rest forms the "power current" for actually doing the work. It is the magnetizing current that causes low power factor. Although it serves a useful purpose in exciting the motor, this magnetism has a property very much like a flywheel. It takes power to build up the magnetic fields, just as it takes power to bring a flywheel up to speed. When the magnetic field collapses, it returns power to the electrical circuit in the same manner that a flywheel gives up its power when it is being brought to rest.

This continual building up and destroying of magnetic fields in the induction motor, due to the rapid periodic reversals of current in the a.c. system, produces current which flows back and forth between the motor and the power house. This surging current is not "true power," since its net flow in a given direction is zero. Almost the same amount of power that magnetizes the motor's field for one-half cycle is returned the next one-half cycle when the magnetic field collapses with the reversal of current. It never leaves the circuit in the form of mechanical work. Wattmeters do not show it, for they indicate only the flow of working current times the voltage—the active power (kw.) that never returns to the source, but is consumed in the motor.

"The interaction of magnetic forces inside an induction motor gives it the ability to do work. Current feeding the motor splits to do two jobs; one part sets up the magnetic fields, and the rest forms the "power current" for actually doing the work. It is this magnetizing current that causes low power factor."

The exact amount of magnetizing current depends on the size of the induction motor and the intensity of its magnetic field. The flow of power current depends only on the load and the losses of the motor. At light load, the induction motor's power factor is about 20 per cent; at full load it rises to 85 per cent (Fig. 3). When idling, the magnetizing current may be four times the power current, whereas at full load this exciting current is only half as much as the power current (Fig. 4). It is interesting that an induction motor can never itself have 100 per cent power factor—no more than the mule can have a towpath directly down the middle of the canal.

Obviously, wires, transformers, circuit breakers, generators, and the like in a circuit of low power factor must be designed to carry this sizable "workless" magnetizing current in addition to the working current. In brief, this means either greater investment by the power company (and higher rates for customers) or else an overloaded line, with resulting loss of torque and speed in the motors of your plant.

Static condensers are a common means of raising the power factor in the food industries (Fig. 5). A static condenser, by virtue of its electrical elasticity, when connected near an induction motor will store up the magnetizing current, thus freeing the transmission generating equipment of that non-productive burden. The power factor of the motor itself remains unchanged, but the power factor from the capacitor (condenser) back to the power house is improved. In the one-half cycle in which the motor's field collapses, the power returned to the circuit is absorbed by the capacitor, and during the next one-half cycle the capacitor discharges this same power to magnetize the motor fields.

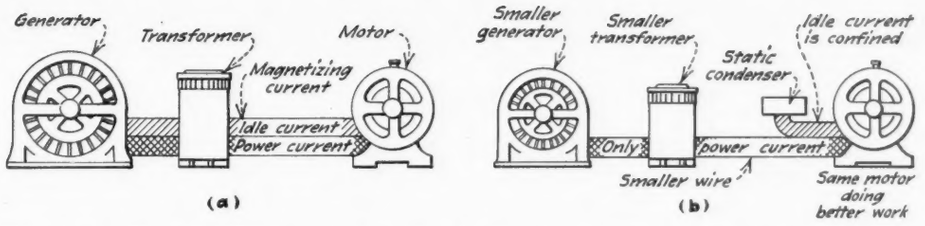


Fig. 5—(a) When the "idle" current is high, wire, transformers, and central station equipment must be designed to carry it. (b) What happens when a capacitor removes the "idle" current

The power loss in the capacitor itself is negligible—about one-fourth of one per cent. Another way of supplying this exciting current locally and relieving the central station apparatus is by using a synchronous motor. This not only raises the power factor but can operate a mechanical load at the same time.

A glance back at the typical sketch (Fig. 2) shows what can be done to improve the power factor:

1. The side representing "idle" current can be shortened by adding capacitors, synchronous condensers, or synchronous motors.
2. The base, representing "true power," can be lengthened by loading up the underloaded induction motors and adding a 100 per cent power-factor synchronous motor.
3. A combination of one and two can be used.

Suppose, for example, we want to find the power factor of a plant which has three small induction motors and one large induction motor. On the plant switchboard the voltmeter reads 440 volts, and the ammeter reads 443 amp., which makes the total *three-phase*

$$\text{"received power"} = \frac{1.73 \times 440 \times 443}{1{,}000} = 334 \text{ kva.}$$

Also, the wattmeter reads, 200 kw.

$$\text{Power factor of the plant therefore} = \frac{\text{kw.}}{\text{kva.}} = \frac{200}{334} = 60 \text{ per cent.}$$

From trigonometric tables 0.6 is the cosine of a 53-deg. angle. Laying these figures out to scale separated by a 53-deg. angle gives the triangle in Fig. 6-a, which shows the existing conditions in the plant.

The wasted power can be "scaled off" or easily figured:

$$\text{Wasted power} = \sqrt{334^2 - 200^2} = 268 \text{ kva.}$$

If the plant electrical engineer decides to raise the power factor to 90 per cent by the installation of a capacitor, he merely figures how many of the wasted kva. must be removed. To carry 200-kw. load at 90 per cent power factor, the kva. input (hypotenuse) would only have to be:

$$\frac{200}{0.9} = 222 \text{ kva. (instead of 334).}$$

Laying this out to scale to where it meets the "wasted power" line, the old triangle shrinks to that shown in Fig. 6-b. The 171.5 kva. of wasted power absorbed by the capacitor and the 96.5 kva. of idle power remaining can be scaled off directly, or be calculated as follows at 90 per cent power factor:

$$\text{Idle power} = \sqrt{222^2 - 200^2} = 96.5 \text{ kva.}$$

The amount which the capacitor must be able to absorb, therefore, is 268 — 96.5 = 171.5 kilovolt-amperes.

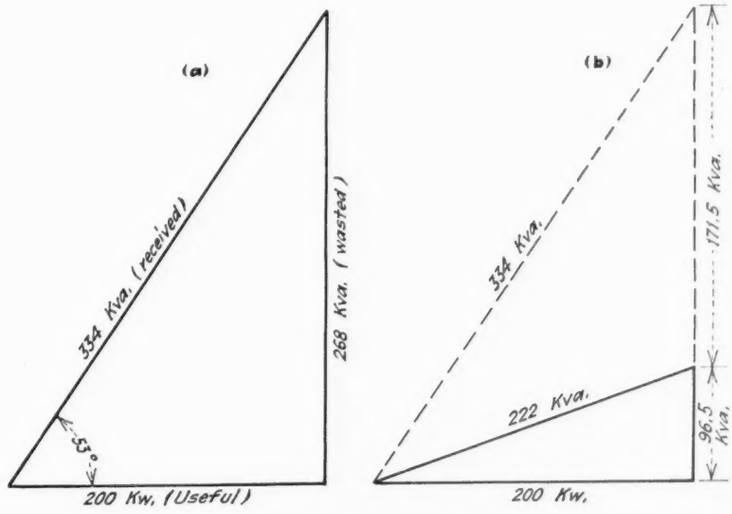


Fig. 6—(a) How the power is divided at 60 per cent power factor. (b) The same useful power as delivered at 90 per cent power factor

Distribution of Sales of Manufacturing Plants In the Food Industries, 1929

By EDWARD R. DEWEY
Chief, Industrial Marketing
Bureau of the Census

THE Census of Distribution has for the first time made available information in a quantitative form regarding channels through which manufactured food moves from plant to consumer.

The major channels through which manufacturing plants sell their goods are: (A) through wholesalers not affiliated with the manufacturing plant; (B) through manufacturers' own wholesale sales branches, sometimes operating in competition with wholesalers and sometimes selling to them; (C) directly from their own plants through chain and independent retail stores with which the factory is not affiliated; (D) through their own retail stores; (E) direct to other manufacturing plants or to the institutional market; and (F) direct to the individual or household consumer. The letters A, B, C, D, E, F, refer to the columns so marked in the accompanying table.

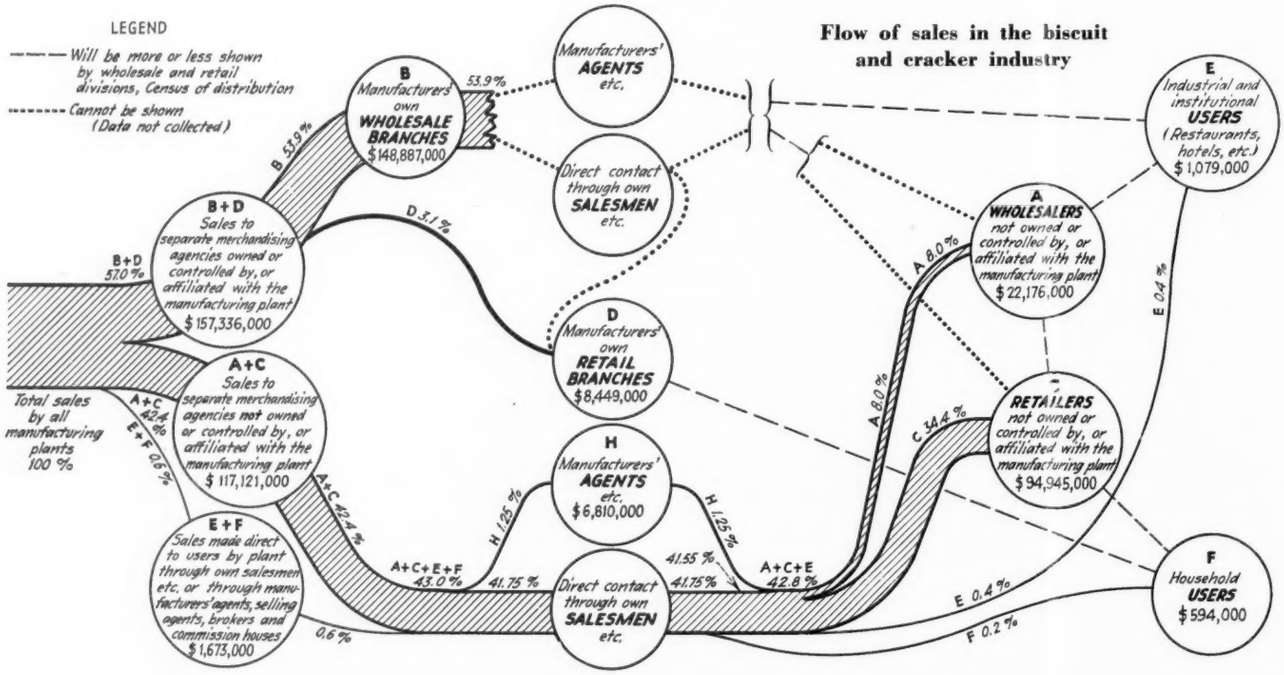
The sales to wholesalers (A) or retailers (C) or to other factories (E) may be made either through their own salesmen, or by means of manufacturers' agents, selling agents, brokers, and/or commission houses.

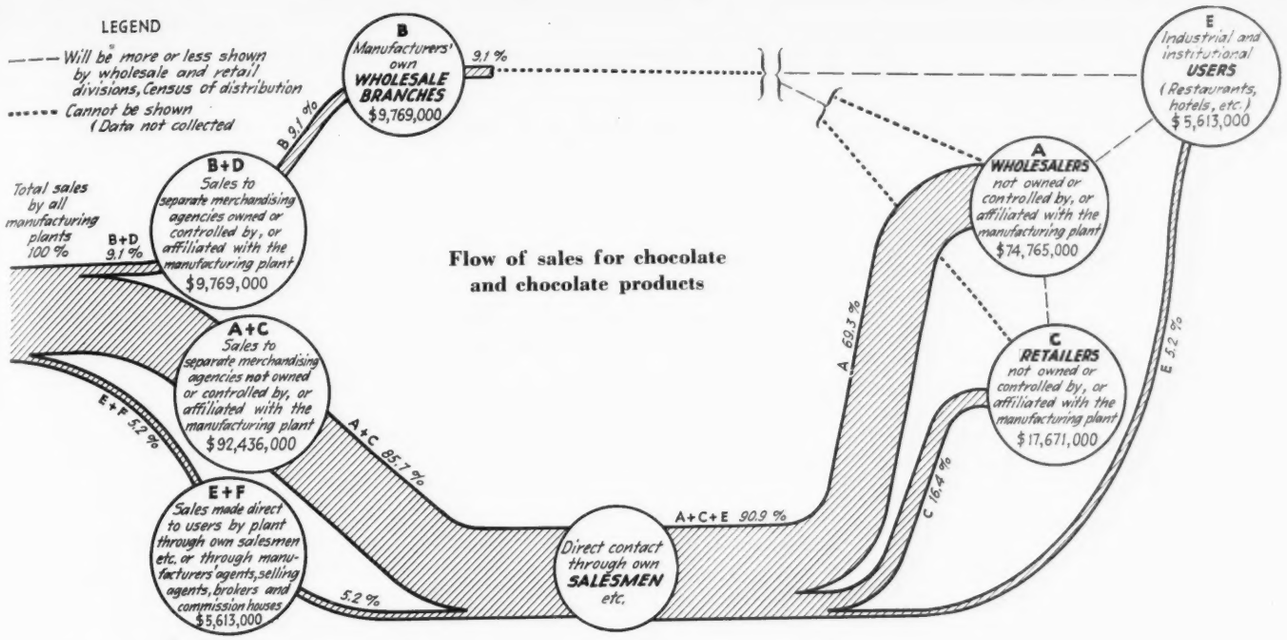
Obviously, no such outside agencies are necessary when sales are made to other plants of the same organization (B or D above). Neither are such outside agencies employed in effecting sales to the ultimate user.

Distribution of Sales, 1929, for Manufacturing

Industry	(1) Value of products shipped and delivered by manufacturing plants engaged primarily in making the products of the industry indicated, Dollars (000 omitted)	(2) Wholesaling done by manufacturing plants, Dollars (000 omitted)	(3) Increases in inventory, Dollars (000 omitted)	(4) Total Sales (1) plus (2) minus (3), Dollars (000 omitted)	Total Sales ("A" plus "B" plus "C" plus "D")		Sales to Wholesale Agencies					
							Total ("A" plus "B")		Sales to Wholesalers "A"		Sales to manufacturers own wholesale branches "B"	
					Amount Dollars (000 omitted)	Per Cent of (4)	Amount Dollars (000 omitted)	Per Cent of (4)	Amount Dollars (000 omitted)	Per Cent of (4)	Amount Dollars (000 omitted)	Per Cent of (4)
Biscuits and Crackers	276,130	.....	.....	276,130	274,457	99.4	171,063	61.9	22,176	8.0	148,887	53.9
Cereal preparations	175,223	.....	.....	175,223	172,627	98.5	157,163	89.7	(2)	....	(2)	....
Chewing gum	60,977	.....	.....	60,867	60,753	99.8	52,422	86.1	52,422	86.1	(1)	....
Chocolate and cocoa products	117,410†	.....	.....	107,818	102,205	94.8	84,534	78.4	74,765	69.3	9,769	9.1
Corn syrup, etc.	165,989	.....	.....	164,581	90,069	54.8	90,069	....	90,069	54.8	(1)	....
Feeds	402,787	20,823	.....	423,610	351,306	82.9	136,824	32.3	117,056	27.6	19,768	4.7
Flavoring extracts	128,472	.....	.....	128,472	113,555	88.4	90,995	70.8	81,198	63.2	9,797	7.6
Lard substitutes	★154,553	.....	1,711	152,842	143,555	93.9	141,466	92.5	20,779	13.6	120,687	78.9
Macaroni	46,916	.....	.....	46,916	43,020	91.7	26,792	57.1	25,359	54.0	1,433	3.1
Malt	22,887	.....	.....	22,884	10,702	46.8	5,288	23.1	(2)	....	(2)	....
Oleomargarine	41,028	.....	.....	46,522	45,466	97.7	30,640	65.8	24,803	53.3	5,837	12.5
Peanuts	49,609	.....	.....	49,609	45,688	92.1	44,101	88.9	36,710	74.0	7,391	14.9
Rice cleaning	48,370	.....	.....	48,794	45,925	94.1	45,925	94.1	44,025	90.2	1,900	3.9
Sugar, beet	★108,351	.....	*9,917	98,636	92,589	93.9	92,589	93.9	92,589	93.9	(1)	....
Sugar, cane	★16,227	.....	958	17,368	7,660	44.1	7,627	43.9	7,627	43.9	(1)	....
Sugar refining	507,389	.....	.....	507,389	464,217	91.5	402,761	79.4	270,427	53.3	132,334	26.1
Vinegar and cider	★10,119	.....	.....	11,014	10,732	88.3	8,192	74.3	7,879	71.5	313	2.8

★Value of products manufactured *May include some inter-plant transfers. †Includes inter-plant transfers.

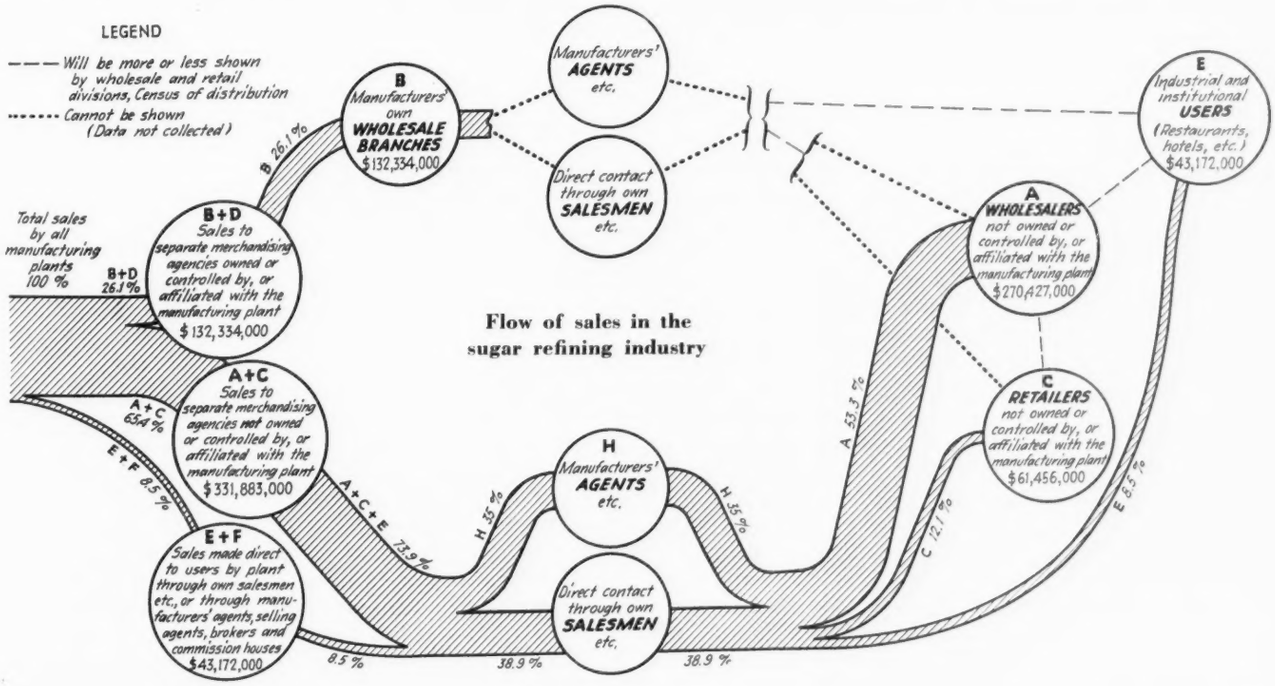

LEGEND
Will be more or less shown by wholesale and retail divisions, Census of distribution
Cannot be shown (Data not collected)
Flow of sales in the biscuit and cracker industry
Total sales by all manufacturing plants 100 %
B Manufacturers own WHOLESALE BRANCHES $148,887,000
53.9%
B 53.9%
Manufacturers' AGENTS etc.
Direct contact through own SALESMEN etc.
B+D Sales to separate merchandising agencies owned or controlled by, or affiliated with the manufacturing plant $157,336,000
B+D 57.0%
D 3.1%
A+C Sales to separate merchandising agencies not owned or controlled by, or affiliated with the manufacturing plant $117,121,000
A+C 42.4%
E+F 0.6%
D Manufacturers' own RETAIL BRANCHES $8,449,000
H Manufacturers' AGENTS etc. $6,810,000
H 1.25%
E+F Sales made direct to users by plant through own salesmen etc. or through manufacturers' agents, selling agents, brokers and commission houses $1,673,000
A+C+E+F 43.0%
41.75%
0.6%
Direct contact through own SALESMEN etc.
41.55%
41.75%
A+C+E 42.8%
A WHOLESALERS not owned or controlled by, or affiliated with the manufacturing plant $22,176,000
A 8.0%
A 8.0%
C 34.4%
RETAILERS not owned or controlled by, or affiliated with the manufacturing plant $94,945,000
E Industrial and institutional USERS (Restaurants, hotels, etc.) $1,079,000
E 0.4%
E 0.4%
F Household USERS $594,000
F 0.2%


LEGEND
Will be more or less shown by wholesale and retail divisions, Census of distribution
Cannot be shown (Data not collected
B Manufacturers' own WHOLESALE BRANCHES $9,769,000
B 9.1 %
B+D Sales to separate merchandising agencies owned or controlled by, or affiliated with the manufacturing plant $9,769,000
Total sales by all manufacturing plants 100 %
B+D 9.1 %
A+C Sales to separate merchandising agencies not owned or controlled by, or affiliated with the manufacturing plant $92,436,000
E+F 5.2 %
E+F Sales made direct to users by plant through own salesmen etc. or through manufacturers' agents, selling agents, brokers and commission houses $5,613,000
5.2 %
A+C 85.7 %
Direct contact through own SALESMEN etc.
A+C+E 90.9 %
A 69.3 %
C 16.4 %
E 5.2 %
A WHOLESALERS not owned or controlled by, or affiliated with the manufacturing plant $74,765,000
C RETAILERS not owned or controlled by, or affiliated with the manufacturing plant $17,671,000
E Industrial and institutional USERS (Restaurants, hotels, etc.) $5,613,000
Flow of sales for chocolate and chocolate products

Plants in 17 of the 32 Food Industries

Industry	Sales to Retail Agencies: Total Sales ("C" plus "D")		Sales to Retail Agencies: Sales to retailers "C"		Sales to Retail Agencies: Sales to manufacturers own own retail branches "D"		Sales to merchandising agents affiliated with plant ("B" plus "D")		Sales to merchandising agencies not under control ("A" plus "C")		Sales Direct From Manufacturing Plants to Users: Total ("E" plus "F")		Sales Direct From Manufacturing Plants to Users: Sales to industrial users "E"		Sales Direct From Manufacturing Plants to Users: Sales to household users "F"		Sales to "A" or "C" or "E" made through manufacturers' agents, selling agents, broke or commission houses	
	Amount Dollars (000 omitted)	Per Cent of (4)	Amount Dollars (000 omitted)	Per Cent of (4)	Amount Dollars (000 omitted)	Per Cent of (4)	Amount Dollars (000 omitted)	Per Cent of (4)	Amount Dollars (000 omitted)	Per Cent of (4)	Amount Dollars (000 omitted)	Per Cent of (4)	Amount Dollars (000 omitted)	Per Cent of (4)	Amount Dollars (000 omitted)	Per Cent of (4)	Amount Dollars (000 omitted)	Per Cent of (4)
Biscuits and crackers	103,394	37.5	94,945	34.4	8,449	3.1	157,336	57.0	117,121	42.4	1,673	0.6	1,079	0.4	594	0.2	6,810	2.5
Cereal preparations	15,464	8.8	15,464	8.8	(1)	....	.....	....	(2)	....	2,596	1.5	2,596	1.5	.....	....	20,097	11.5
Chewing gum	8,331	13.7	8,331	13.7	(1)	....	.....	....	60,753	99.8	114	0.2	114	0.2	.....	....	2,862	4.7
Chocolate and cocoa products	17,671	16.4	17,671	16.4	(1)	....	9,769	9.1	92,436	85.7	5,613	5.2	5,613	5.2	.....	....	.....	....
Corn syrup, etc.	(1)	....	(1)	....	(1)	....	(1)	....	90,069	54.8	74,512	45.2	74,512	45.2	.....	....	18,841	11.4
Feeds	214,482	50.6	175,271	41.4	39,211	9.2	58,979	13.9	292,327	69.0	72,304	17.1	72,304	17.1	.....	....	46,118	10.0
Flavoring extracts	22,560	17.6	17,663	13.8	4,897	3.8	14,694	11.4	98,861	77.0	14,917	11.6	12,684	9.9	2,233	1.7	19,089	16.1
Lard substitutes	2,089	1.4	2,089	1.4	(1)	....	120,687	78.9	22,868	15.0	9,287	6.1	9,287	6.1	.....	....	7,981	24.8
Macaroni	16,228	34.6	(2)	....	(2)	....	.....	....	(2)	....	3,896	8.3	3,156	6.7	740	1.6	8,411	18.6
Malt	5,414	23.7	5,414	23.7	(1)	....	(2)	....	(2)	....	12,182	53.2	12,182	53.2	.....	....	.....	....
Oleomargarine	14,826	31.9	14,826	31.9	(1)	....	5,837	12.5	39,629	85.2	1,056	2.3	1,056	2.3	.....	....	4,708	11.6
Peanuts	1,587	3.2	1,587	3.2	.....	....	7,391	14.9	38,297	77.2	3,921	7.9	3,770	7.6	151	0.3	16,426	33.1
Rice cleaning	(1)	....	(1)	....	(1)	....	1,900	3.9	44,025	90.2	2,869	5.9	2,869	5.9	.....	....	31,531	64
Sugar, beet	(1)	....	(1)	....	(1)	....	.....	....	92,589	93.9	6,047	6.1	6,047	6.1	.....	....	92,371	93
Sugar, cane	33	0.2	33	0.2	(1)	....	.....	....	7,660	44.1	9,708	55.9	9,708	55.9	.....	....	6,624	38.1
Sugar refining	61,456	12.1	61,456	12.1	(1)	....	132,334	26.1	331,883	65.4	43,172	8.5	43,172	8.5	.....	....	354,772	70
Vinegar and cider	1,540	14.0	1,417	12.9	123	1.1	436	3.9	9,296	84.4	1,282	10.7	1,163	10.6	119	1.1	3,121	28.3

(1) No sales through these channels reported (2) Cannot be shown separately without disclosing individual operations.


LEGEND
Will be more or less shown by wholesale and retail divisions, Census of distribution
Cannot be shown (Data not collected)
B Manufacturers' own WHOLESALE BRANCHES $132,334,000
B 26.1 %
Manufacturers' AGENTS etc.
Direct contact through own SALESMEN etc.
B+D Sales to separate merchandising agencies owned or controlled by, or affiliated with the manufacturing plant $132,334,000
Total sales by all manufacturing plants 100 %
B+D 26.1 %
A+C Sales to separate merchandising agencies not owned or controlled by, or affiliated with the manufacturing plant $331,883,000
A+C 65.4 %
E+F 8.5 %
E+F Sales made direct to users by plant through own salesmen etc., or through manufacturers' agents, selling agents, brokers and commission houses $43,172,000
8.5 %
A+C+E 73.9 %
H 35 %
H Manufacturers' AGENTS etc.
Direct contact through own SALESMEN etc.
38.9 %
38.9 %
A 53.3 %
C 12.1 %
E 8.5 %
A WHOLESALERS not owned or controlled by, or affiliated with the manufacturing plant $270,427,000
C RETAILERS not owned or controlled by, or affiliated with the manufacturing plant $61,456,000
E Industrial and institutional USERS (Restaurants, hotels, etc.) $43,172,000
Flow of sales in the sugar refining industry

Reforming Corporation Accounts

By STANLEY DeJ. OSBORNE
Treasurer, Atlantic Coast Fisheries Co.
New York City

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A PERIOD of depression, such as we have on our hands now, seems a good one in which to reappraise the value of many functions carried on in industrial corporations. During the late-lamented hysteria business was so good and profit spreads so wide that many needless overhead expenses crept into production costs. This fact is especially true of the smaller industrial company, which, aided and abetted by "scientific-management" literature, was making a bold effort to keep up the pace of the larger and richer industrials.

Today every company that expects to survive must, of necessity, trim its sails and every effort must be made to reduce costs and increase sales at lower prices. Especially is this fact true of companies dealing in food commodities, where prices have taken such a drastic drop. The process of eliminating factory waste and cutting sales expense ratio to a reasonable figure probably has been fairly well accomplished, but have the "non-profit" departments been attended to in a proper way?

A research department is very expensive, but here one successful experiment can justify years of expenditure, and from this standpoint it would be folly to eliminate or cut it down very much. The gamble is there and unless a company is in a very difficult state it is a justifiable expense.

The other "stepsons" of industry, the so-called financial departments, however, are still carrying on with expensive overheads, because we refuse to look upon them realistically. Most operating executives want a mass of figures and they leave it to the accounting division to get them, but the best that is in this department and allied departments is not brought out, because no real thought is given to what they can produce to benefit management.

I am wholeheartedly in favor of amassing figures, but only in so far as they benefit management, in so far as they are inexpensive, and in so far as they are simple. Accounting, as a science, is vastly entertaining, but a little sense of humor must be attached to it.

If a company wants to indulge in luxuries, there is no nicer one than the accounting department, for many are its possibilities of refinement and expense; but in smaller industrial units it would be far better to scrap all "systems" and to build up a department that will fit the needs of the particular business and will produce *management* figures. Accounting is little more than "common-sense pigeonholing," but unfortunately, due to the tenets of the profession and the encouragement of accounting literature, very little common sense is used in adapting it to the small business. A cheap and simple record of a company's activities is enough and it seems high time that a more realistic attitude be taken toward the needs of individual concerns.

Costs are most important for proper management, but there are cheap and expensive methods of obtaining them. Too much refinement will have the effect of presenting to the operating departments figures that are non-essential, superfluous figures, and statements that are so intricate that they soon require an interpreter. The academically perfect cost system rarely fits the needs of management. Really only the main product or products of a corporation should be costed carefully, and even these as simply as possible. Secondary and byproducts should be given only scant attention, unless produced in large quantities, for in most cases the selling price is governed not by cost but by market conditions, and since they must be produced as a part of the operation why add expense to the cost.

Most accountants are very loath to rip apart a "system," but somehow it seems that executives would be amazed to find that accounting departments could be reduced; that expense could be cut; and that in the end the figures probably would be better. After the production department has reduced costs to the bone, and the sales department has become perfect (?), sit down and ask yourself whether the mass of information and figures you get are really essential or whether you like them because of habit. Are you getting management figures or income-tax figures?

Another thought in this connection: A year ago, or six months ago, some executive asked for certain figures —he got them and used them for a particular purpose in mind at the time. He or someone else probably still gets similar figures, but the need is no longer there.

You wouldn't think of having obsolete machinery, but you don't consider obsolete statements; machinery is paid for and depreciated, but payrolls keep piling up twelve months a year.

Don't just consider eliminating one man and feel pious about that; really analyze the fact whether the department is functioning to get the best work for the management! If this analysis is sincerely undertaken, it may prove amazing. The head of it should be as familiar with company policy and operations as anyone else, and with judgment and common sense could cut the expense in half. But don't expect a professional to do this; a system is too dear to his heart.

And while on the subject of corporate stepchildren, how effective is the credit and collection department? A good credit department is necessary and will keep an overanxious sales department from gambling you out of business, but this is really routine work and requires a good man with keen judgment. Most companies realize

this, but nevertheless have neglected collection work.

Such work more often than not is left to a clerk who keeps the record of receivables. He is a letter writer who has acquired a nice set of standard forms of begging and who can always fall back on that great bear, the collection attorney. One intelligent collector is worth ten clerks and attorneys, for he will not only keep his receivables down but will also help educate his customers in themselves selling and collecting.

If you had to borrow every cent to carry receivables at the bank, you would realize what it costs to let collections slide and to give long credit terms. Credit selling is something that has suddenly burst on America's business world during the past decade. Far better minds than mine have approved of the "inflationist" theory of credit selling, but I still believe that it has been overdone, and with proper attention focussed on this angle good profits may be reaped. If your product has an economic place in the business world, and as such has at least a certain demand, you should be in a position to do some missionary work on your customers.

Average net profits on sales of food commodities are 5 to 10 per cent: every 30 days you carry a receivable you lose ½ per cent. Every 30 days you save in collection work you increase your earnings ½ per cent which will increase your net profits by 5 to 10 per cent. This, of course, is on the basis that you can earn 6 per cent with your working capital. If you cannot, in ordinary times, you had better close up shop, invest in 6 per cent bonds, and eliminate the risks of business.

Splendid theory, but how to put it into effect! If your product has an economic necessity (and if it hasn't, better pass on) it should be possible to have the customer help carry the burden. The use of interest-bearing negotiable instruments such as trade acceptances will help immensely. If your average receivable turnover is 60 days, issue a trade acceptance at no interest for 30 days and interest bearing for 30 more. At maturity collect through the banks. A bank collection makes the customer think a bit longer than an ordinary statement. His credit standing is at stake and he will make every effort to pay up. The effect on him is to speed up his own collections and thus down the line to keep money turning over. Frozen credits are expensive and sales to non-paying customers are foolhardy.

If a customer is a good one but slow, a good collection man in your employ should be able to go into his business, analyze it, and use some of your methods for him. Many times this will make a slow-paying customer a good one, and a better merchant.

Credit selling has become so widespread that the morals of paying have been torn down to a large degree. It is high time something be done to build back the desire to pay on the spot.

Another phase of a finance department's activities that can be made profitable is the insurance end. Where properties are scattered and insurance has been placed separately, consider the advisability of grouping the purchasing power so represented, for it will save a lot of money. This is so self-evident that it need hardly be mentioned, but it is startling how little attention is given to this field.

If I have been able to set out my point intelligently, I have tried to prove that the so-called financial departments of a smaller business can be made much more efficient. Emphasis has been placed too much on accounting, and academic thinking has entered too much into the field. Just as much business judgment is required to handle a finance department well as any other department, but don't let "systems," with their fascinating possibilities, hide the real object of the work, namely: "management figures," quicker money turnover, and less expense. Better hire a few high- and medium-priced men than many low-priced ones, for in the former you will get some judgment and thinking; in the latter just a group of mechanized robots. It really pays good dividends.

▼ ▼ ▼

What Meat Costs In Wisconsin

FOOD inspectors of the Wisconsin Department of Agriculture and Markets called on representative meat markets in these various cities: 34 markets in Madison, 47 in Milwaukee, 13 in Milwaukee suburbs, 21 in Kenosha, 13 in Green Bay, 11 in Janesville, 19 in Superior, and 9 in La Crosse; a total of 167. Information as to quality and retail prices was obtained for various cuts of beef, veal, lamb, and pork for January and February, 1930, and for January and February, 1931. Data were gathered also as to wholesale prices these dealers paid during this same period, and these figures were checked with prices secured from the various packers and wholesalers operating in Wisconsin.

The average mark-up in per cents for all of these cities is: Beef, 49.3; veal, 47.6; lamb, 44.8; pork, 37.9. The per cent of gross profit on total retail sales is as follows: Beef, 33.02; veal, 32; lamb, 30.93; pork, 27.48.

The average decline in per cents at wholesale from January and February, 1930, to the same period in 1931 was as follows: Beef, 33.25; veal, 49.55; lamb, 26.03; pork, 29.04. The corresponding decline in per cents at retail during the same period is as follows: Beef, 25.6; veal, 24.6; lamb, 22.7; and pork, 28.35.

In all of the various meat markets from which information was obtained, 42 per cent of the total sales was beef. The better cuts, such as porterhouse steak from carcasses, sold at from 40c. to 60c. per lb.; pot roast, from 22c. to 27c.; and short ribs and brisket, from 12c. to 15c. These same cuts in a lower grade of beef sold: Porterhouse steak, from 18c. to 35c.; pot roast, 14c. to 19c.; short ribs and brisket, from 6c. to 10c.

Ten per cent of all the meats sold in these shops from which data were obtained was veal. The top veal prices were: Leg, 25c. to 35c.; chops, the same; shoulder roast, 20c. to 25c.; breast of veal and stew, 12c. to 20c. The cheaper grades of veal sold: Leg, 18c. to 20c.; chops, 14c. to 18c.; shoulder roast, 13c. to 16c.

Twenty-five per cent of all meats sold was pork. The outstanding feature in the price of pork was boiled ham. The wholesale prices declined 20.71 per cent. The average retail decline was only 14.85 per cent. In many cases only an 8 per cent decline was found.

This study attempts to draw a picture of the retailing of meats. Many problems entered into this phase of the work and it is rather difficult to draw conclusions that are fair to all concerned. The net profit that the meat market should make is dependent in a large way on its volume of business. A market doing a $100,000 volume of business can make a reasonable profit on a much smaller per cent on its sales than one doing only a $15,000 volume of business annually.

Bacteria Aid in Purification of Creamery Wastes*

By MAX LEVINE

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PURIFICATION of creamery wastes has become a vexing question in many localities. In some instances city officials have prohibited creameries from discharging wastes into municipal sewerage systems through fear of disrupting the city sewage disposal plant. Is there any basis for this apprehension, and if there is, what are the properties or peculiarities of creamery wastes that render them so troublesome? These questions may best be answered by comparing municipal sewage and creamery wastes as to composition, and by consideration of the nature of the changes taking place when these wastes are subjected to the common municipal sewage-treatment processes.

The oxygen-consuming power and the concentration of nitrogenous substances are two convenient measures of the character of a sewage or trade waste. Ordinary sewage rarely contains over 25 mg. of nitrogen (as NH_3 and organic nitrogen) per liter, whereas creamery wastes generally contain about twice as much, and not infrequently four to six times as much, nitrogenous matters. The really significant difference, however, is with respect to the oxygen-consuming properties. Municipal sewage generally consumes about 50 mg. of oxygen per liter when treated with an oxidizing agent such as potassium permangenate, whereas creamery wastes similarly treated consumed from 600 to 1,500 mg. of oxygen, or 12 to 30 times as much as domestic sewage.

The ratio of oxygen-consuming to nitrogenous constituents in domestic sewage is about 2.5 to 1, whereas in creamery wastes it is generally 10 or 12 to 1. This high ratio is due to the presence in creamery wastes of lactose (milk sugar), which is practically, if not entirely, absent from domestic sewage. It is the presence of this lactose which is really at the bottom of the difficulties encountered in treatment.

When ordinary sewage enters a septic, or Imhoff, or other tank from which air is excluded, a large portion of the solids settle out. The clarified effluent, which has been but slightly changed as respects reaction, passes on to the filters or other purification devices, and the settled solids are gradually transformed into liquid or gaseous materials. These latter changes are due to bacteria, which require a neutral or slightly alkaline reaction for their activities. A milk waste passing through a similar tank shows an entirely different train of changes. The milk sugar quickly becomes acid, causing precipitation of casein. The acid effluent is more difficult to treat and the precipitated casein is not digested, because of the acidity which is germicidal to many of the digesting bacteria.

The determination which has been found to be particularly helpful in measuring effects of reaction on the activities of bacteria is the H-ion concentration. For convenience the so-called "pH scale" is employed to designate the H-ion concentration. This scale runs from pH 0 to pH 14; pH 7 is the neutral point. As the numbers decrease increased acidity is indicated, and vice-versa. Thus pH 0 is the most acid and pH 14 the most alkaline.

Several points on this scale should be particularly noted with respect to the biological disposal of creamery wastes: (*a*) the neutral point is at pH 7.0; (*b*) decomposition or digestion of casein and other organic nitrogen compounds takes place best at a slightly alkaline reaction, pH 7.4-7.6; (*c*) this protein digestion is distinctly and markedly inhibited at moderately acid reactions, pH 5.5; (*d*) at slightly more acid reactions (pH 5.0), many of the casein digesting bacteria are killed; and (*e*) if the acidity reaches pH 4.2-4.4, the casein is precipitated, and the rate of protein decomposition, in the absence of air, falls to a minimum.

To ascertain what reaction will develop if creamery wastes are stored in septic or other tanks, five creameries in Iowa were visited on each of several days, and samples were collected at the sewer outlet every 30 min. for the entire day's operating period. The analyses of such 24-hr. composites are shown in Table I, where the effect of storage in the absence of air also is indicated. It is evident that inhibiting acidities developed in twelve of sixteen samples collected and that in eight of these cases the acidity was sufficiently high to kill many of the protein digesting bacteria.

The problem of biological disposal of creamery wastes resolves itself therefore into that of devising means for destroying milk sugar without development of detrimental acidities. If milk wastes and sewage are stored in the absence of air there are developed from this sugar such compounds as the relatively strong lactic acid and extremely ill-smelling butyric acid, whereas if an abundance of air is supplied, these undesirable acids are oxidized to the unobjectionable carbon dioxide. Exposing the waste to oxygen by bubbling air through it, as is done in the activated sludge process or by permitting the sewage to trickle over well-aerated beds of cinders, or broken rock, instead of keeping the air away, is the underlying principle of biological creamery waste disposal.

Experiments along these lines have been in progress at the engineering experiment station of the Iowa State College for a number of years, and the results clearly demonstrate that aeration processes are dependable for the elimination of the lactose and prevention of the development of detrimental acidities. The activated sludge process was found to be effective in destroying milk sugar, but very large quantities of air were required; it was extremely difficult to maintain the sludge in suitable condition and the effluents were not stable. It is felt, therefore, that except under specially and peculiarly favorable conditions, the activated sludge process is impractical and not suitable for the average creamery.

Numerous and repeated observations with trickling filters prove conclusively that these devices are remarkably efficient for the removal of acid-producing materials. Some of the results obtained with a lath filter are shown in Table II. The filter consisted of six tiers of ordinary building lath 2 ft. square and 1 ft. deep, with 4-in. spaces between the tiers for sampling. Estimations of the efficiency of removal of acid forming substances were made (*a*) by determining the quantities of milk sugar in the effluents from various depths of the filter, and (*b*) by ascertaining whether these effluents would develop appreciable acidities on anaerobic incubation.

The waste was applied to the filter at a rate of 800,000 gal. per acre per day (g.p.a.p.d.) for 10 to 14 hr. daily. Under these conditions practically all of the sugar was removed from a 4 per cent milk solution by 3 ft. of filtration.

The reactions of the effluents after storage for two days in the absence of air are shown in Table III.

Each of the concentrations of milk employed became distinctly acid on anaerobic incubation, the higher concentrations developing germicidal acidities. Such wastes could not be admitted indiscriminately to city septic or Imhoff tanks. After filtration the effluents remained alkaline, the depth of filtration for production of such alkaline effluents increasing with increasing concentrations of the raw wastes. If a neutral or slightly alkaline reaction (after two days' anaerobic storage) be taken as a criterion of safety for discharge into a municipal sewage plant, then satisfactory effluents were obtained with 1 per cent skim milk filtration through 1 ft., 2 per cent milk through 2 ft., 4 per cent milk through 3 ft., and 7 per cent skim milk required 5 ft. of filtration. Creamery wastes will generally be less concentrated than 4 per cent skim milk, so that shallow filters may be employed if the effluent is to be discharged into a municipal sewer.

In designing a plant for a given situation, certain local factors must be taken into consideration. If the effluent is to be discharged into a municipal sewerage system, partial purification to the extent of removing the acid-producing

*Abstract of a paper read before the Dairy Engineering Committee of the American Society of Agricultural Chemists, Oct. 24, 1930.

constituents would be all that should be necessary. If the effluent is to go to a very small stream or dry run, then more complete purification would have to be resorted to. Should this dry run or creek reach a sufficiently large body of water in the course of several miles, partial purification by filtration, coupled with chlorination of the effluent, will be found most feasible and economical.

The waste, before being applied to the filter, must be given preliminary treatment only to the extent of removing grease and settleable solids, and such preliminary treatment must not be prolonged to a point where acidity develops. In practice it will be found necessary to clean the grease trap and settling tanks frequently to avoid local odor nuisances.

The size of the filter to be employed for any given situation will depend on the degree of purification necessary, concentration, and volume of liquid to be treated. The volume of waste in several of the Iowa butter-making plants has been found to be between 3 and 3½ gal. per lb. of butter manufactured. A filter 1/100 acre in area and 6 ft. deep, if properly constructed and operated, should be sufficient to treat the waste from 1,500 lb. of butter a day, if the effluent is to be discharged into a small city sewage-disposal plant or creek.

Various filling materials have been employed in the experimental filters. These included, (*a*) lath, (*b*) coarse rock, (2-3½ in.), (*c*) gravel (*d*) broken tile, (*e*) cinders, (*f*) spiral ring packing, (*g*) corncobs. The spiral ring packing proved to be very unsatisfactory; small gravel gave good results but clogged very badly; corncobs effected considerable reductions, but are not considered suitable; broken tile gave good purification but the tile gradually disintegrated and packed badly. Lath, coarse cinders, and rock were the most promising filling materials. A typical series of results with these substances is shown in Table IV.

A very convenient and perhaps most useful single measure of the purification effected is to determine the biological oxygen demand (the amount of dissolved oxygen the waste or filter effluent will use up if mixed with water). Employing this measure, it was found that the dosing cycle markedly influenced the degree of purification effected by coarse rock. Thus a waste with an average B.O.D. of 1,100 p.p.m., when applied to a coarse rock filter at a rate of 800,000 g.p.a.p.d. for 10-14 hr. daily but at different dosing cycles, gave the following effluents:

7½ minute cycle..... 95 p.p. m. B. O. D.
10 minute cycle.....126 p.p.m. B. O. D.
20 minute cycle.....229 p.p.m. B. O. D.

With coarse filling materials a short dosing cycle gives the highest degree purification. Finer filling materials give better results with longer dosing cycles.

The studies on disposal of creamery wastes demonstrate clearly that:

1. Anaerobic devices, such as septic or Imhoff tanks, are not suitable for the treatment of creamery wastes because:

(*a*) The milk sugar is rapidly decomposed with the production of acids which may curdle the waste.

(*b*) If the creamery waste is sufficiently concentrated, the resulting acidity will inhibit the protein digesting bacteria and many of these proteolytic organisms will be completely destroyed.

(*c*) The effluents from such anaerobic tanks, because of their high acidity and in some instances suspended curds, are in an undesirable state for most efficient treatment on sand beds or stone filters.

(*d*) The high acidity and consequent relative sterility of the contents of anaerobic tanks receiving sugar wastes result in high relative stabilities of the effluents. These, however, are merely apparent and not true stabilities.

2. Creamery wastes can be rendered innocuous as respects their effect on municipal sewage-disposal plants by subjecting these wastes to some form of aerobic treatment.

3. The activated sludge process is effective for removing acid-forming materials from wastes, but the process is not suitable for the average creamery.

4. Trickling filters are particularly adapted to the biological oxidation of acid-forming constituents in creamery wastes.

5. Stable effluents have been obtained by filtration of 1.0 to 1.5 per cent skim-milk solutions through 6 ft. of cinders at rates of about 500,000 g.p.a.p.d.

6. A short dosing cycle (about 5 to 7 min.) should give much better results than the commonly employed 15- to 20-min. cycle when employing coarse filling materials such as 2- to 3½-in. rock.

7. Filtration of creamery wastes through 4 ft. of coarse cinders (¾ to 1½ in.) or 6 ft. of medium-size rock (1½ to 2½ in.) at 500,000 g.p.a.p.d. should produce effluents which will not become appreciably acid and which, therefore, should not interfere with septic action if admitted to a municipal sewage-disposal plant.

Table I—Composition of Creamery Wastes and Effect Of Anaerobic Storage on Reaction

Analysis results expressed in milligrams per liter (p.p.m.) 30-min. samples on day examined (1924).

Creamery	Date	Oxy. Cons.	Nitrogen Org.	Nitrogen NH_3	Acidity ($CaCO_3$) Initial	Acidity ($CaCO_3$) Stored 2 Days	pH Stored 2 Days	Approximate Equivalent Skim Milk, %
B	8/22	365	41.6	0.4	30	160	5.8	1.0
	8/25	1250	117.5	2.5	70	570	4.2	3.0
D	8/21	670	33.0	12.0	alk	320	5.9	1.5
	8/27	550	56.5	3.4	alk	120	6.4	1.0
N	8/4	3360	286.0	14.0	350	900	3.9	7.0
	8/8	1630	77.5	2.5	100	690	4.1	3.0
R	8/7	400	24.6	3.4	alk	110	7.2	1.0
	8/13	2960	282.0	18.0	240	880	4.3	6.0
	8/14	995	84.0	6.0	100	330	5.8	2.0
	9/9	1980	237.0	13.0	200	900	4.7	4.0
	9/11	1560	131.0	9.0	90	750	4.3	3.0
	9/16	1300	141.0	9.0	70	445	4.8	3.0
S	7/31	590	58.6	3.4	25	80	6.2	1.0
	8/15	285	23.8	1.2	50	65	6.5	0.5
	9/3	885	93.0	2.0	60	430	4.8	2.0
	9/10	660	55.0	5.0	110	320	6.0	1.2
1% skim milk	....	400–450	40–45	1–2	...	...	5.3	1.0

Table II—Effect of Filtration on Elimination of Lactose From Skim Milk Powder Solutions

Milk Concentration	1 Per Cent	2 Per Cent	4 Per Cent	7 Per Cent
Depth of Filtration	Reducing Substances Calculated as p.p.m. Lactose			
Raw (0 ft.)	321*	582*	1700	3254
1 ft.	Trace	86	294	1114
2 ft.	...	...	15	284
3 ft.	...	...	...	154
4 ft.	...	...	...	81
5 ft.	...	...	...	61
6 ft.	...	...	...	55
	Per Cent Reduction			
Raw	00.0	00.0	00.0	00.0
1 ft.	99+	85.2	82.7	65.6
2 ft.	....	99.+	91.2	91.3
3 ft.	....	....	99.+	95.3
4 ft.	....	....	....	97.5
5 ft.	....	....	....	98.1
6 ft.	....	....	....	98.3

*Samples had stood for long time before analysis. (Results lower than normal)

Table III—Removal of Acid Forming Materials by Filtration Of Milk Solutions

Milk Concentration	0.5 Per Cent	1 Per Cent	2 Per Cent	4 Per Cent	7 Per Cent
Depth of Filtration	pH of Effluents stored 48 hours (20 deg. C)				
Raw waste	6.4	5.9	4.6	4.3	4.2
1 ft.	7.4	7.1	6.6	5.3	4.6
2 ft.	7.6	7.5	7.2	6.6	5.8
3 ft.	7.5	7.5	7.5	7.1	6.5
4 ft.	7.5	7.5	7.5	7.4	6.9
5 ft.	7.5	7.5	7.6	7.5	7.2
6 ft.	7.5	7.5	7.6	7.6	7.3
	Acidity of Effluents Stored 48 hours (expressed in p.p.m. $CaCO_3$)				
Raw waste	120	255	400	680	870
1 ft.	20	45	130	250	640
2 ft.	20	30	50	100	290
3 ft.	20	20	20	50	175
4 ft.	20	20	15	30	110
5 ft.	20	20	10	20	80
6 ft.	20	20	10	20	60

Table IV—Purification of Milk Wastes by Trickling Filters With Various Filling Materials

(Applied at 800,000 g.p.a.p.d. for 10-14 hours daily; analysis results expressed in p.p.m.)

Sample	Oxygen Consumed	NH_3	Org.N.	NO_3	pH*	Relative Stability (Per Cent)
Applied waste	398	1.3	51.0	1.3	5.7	...
Coarse cinder effluent	45	0.3	5.7	12.3	7.8	90
Lath. filter effluent	87	0.5	10.7	5.2	7.6	85
Coarse rock, filter effluent	120	2.0	27.2	0.5	6.6	40
	Per Cent Reduction					
Coarse cinder	88.7	77.0	88.8	....	...	...
Lath	78.4	61.6	79.0	....	...	...
Coarse rock	70.0	....	46.7	....	...	...

*After storage at 20 deg. C. for 2 days.

ABSTRACTS OF CURRENT LITERATURE

ZAROTSCHENZEFF QUICK -FREEZING PROCESS. *Ice and Refrigeration,* Vol. 80, p. 305; June, 1931.

The unique feature of the "Z" system consists in exposing the product to be frozen to the action of an atomized brine fog of controlled temperature, either directly or indirectly, as the nature of the product may demand. A continuous process covering chilling, freezing, glazing (when required), packaging, storage, and shipment is provided. Advantages claimed for the "Z" system are economical freezing at about 0 deg. F. in less time than other methods require; saving in space required for installation of equipment; less thickness of insulation of refrigerated space; and less tonnage of refrigerating installations to freeze the same amount of product. A large number diagrams and photographs of the equipment and the frozen products are given.

* * *

ACIDITY IN STORED FLOURS. A. H. Johnson and Jesse Green. *Cereal Chemistry,* Vol. 8, pp. 134-145; March, 1931.

It has long been known that flours increase in their acidity during storage. Experiments have shown that the hydrogen-ion concentration of water extracts of stored flours extracted with ether were the same as those of the extracts of freshly milled flours. It appears that ether-extractable acids are alone responsible for the changes in hydrogen-ion concentration which occur in flours during storage under proper conditions. Only relatively insignificant quantities of lactic acid can be present in the flour.

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DETERMINATION OF RANCIDITY IN OILS AND FATS. A. Taffel and C. Revis. *Journal of the Society of Chemistry and Industry,* Vol. 50, pp. 87-91T; March 13, 1931.

Oils which have been air blown, or have become rancid at moderate temperatures, such as 120 deg. C., or at higher temperatures such as 170 deg. C., contain smaller proportions of easily reducible peroxides and larger portions of difficultly reducible oxides. Consequently, the usual Kreis test for rancidity, which is useful for the easily reducible peroxides, is not satisfactory for the detection of many types of rancidity in cacao butter or oils which have been blown at high temperatures. A modified form of the Kreis test is described, which may be universally applied to determine the rancidity in oils and fats.

PROPERTIES OF IRRADIATED MILK. G. C. Supplee, G. E. Flanigan, and O. J. Kahlenberg. *Journal of Biological Chemistry,* Vol. 91, pp. 773-789; May, 1931.

Negative antirachitic and calcifying properties were obtained from the irradiated non-saponifiable fraction of milk fat, as determined by the curative method with white rats and the preventive method with chickens. Milk irradiated in fluid form and subsequently dried by the double-roller process showed marked antirachitic properties, which varied with the fat content of the milk and the period of exposure. A few seconds' time is sufficient to irradiate milk to a high percentage of its potential maximum, and activation is attained without detectable change in taste or order.

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EFFECT OF HEAT UPON THE BIOLOGICAL VALUE OF CEREAL PROTEINS. A. F. Morgan, *Journal of Biological Chemistry,* Vol. 90, pp. 771-792; March, 1931.

Experiments with young rats show that the protein of cereals subjected to dry heat or toasting at approximately 200 deg. C. for 45 min., or to similar procedures during manufacture, is not well utilized for growth. Cooking with water had but little similar effect and caramel formation during toasting was found to account for only a small part of the injury. The digestibility of the toasted proteins was but slightly different from that of the raw proteins in the case of older animals. The heat treatment probably produces a change in the assortment or availability of the amino-acids absorbed.

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A NEW METHOD FOR TESTING AGAR AND GELATIN JELLIES. H. C. Lockwood and R. S. Hayes. *Journal of the Society of Chemistry and Industry,* Vol. 50, pp. 145-151; April 24, 1931.

The Ridgelimeter used for these tests is a depth micrometer measuring instrument. Results show that heating is not nearly so detrimental to gelatin as usually is stated, but there is an appreciable loss of jelly strength in the presence of acids and subsequent boiling. Graphs show the effects of temperature on agar and gelatin jellies, also the rigidity of both agar and gelatin jellies at various concentrations. Further applications of this instrument are being applied to pectin, carrageen, and albumin in a study of their jellying properties.

PARCHMENT USED FOR PACKING DAIRY PRODUCTS. Paul Arup. *The Analyst,* Vol. 56, pp. 149-161; March, 1931.

A detailed account is given of the compositions of 23 samples of "vegetable parchment." An important phase of the subject studied included experiments to determine the support of mold growth under favorable conditions of moisture and temperature. An unduly high content of water-soluble extract, based on addition of sugar, renders the parchment particularly susceptible to attack by mold. Papers free from glycerin or sugar are very resistant to mold growth.

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LOSS OF VITAMIN *A* IN BAKING COOKIES. Helen T. Parsons and others. *Journal of Home Economics,* Vol. 23, pp. 366-372; April, 1931.

Since butter cookies have been utilized as carriers of vitamin A in difficult feeding cases, it was desirable to determine the loss of this vitamin during the baking of such a product. Results show a loss of from $\frac{1}{4}$ to $\frac{1}{3}$ of the original vitamin A content of thin butter cookies baked to a light brown color for 10 min. in an oven with a temperature of 320 deg. F., and during a subsequent storage period of not more than five days.

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NEW PROCESS FOR COFFEE TREATMENT. H. Jordt. *Chemiker-Zeitung,* Vol. 55, p. 161; Feb. 28, 1931.

An excess of coffee combined with tannic acid gives a hard astringent taste to many brands. Previous treatments of coffee with ozone have required much longer times of exposure, which simultaneously produced harmful compounds. A new process, patented in Germany, produces coffee yielding a milder tasting beverage, by treatment of the raw bean with ozone. The raw bean is placed in a vessel, which is evacuated to 10 mm. pressure, then filled to atmospheric pressure with ozone. This causes immediate impregnation of the inner nucleus of the bean, without permeation by slow diffusion through the surface. After an hour of exposure to the ozone in the vessel, the coffee is removed and roasted in the usual manner.

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COPPER AND HEALTH. Wm. G. Schneider. *Journal New England Water Works Assoc.,* Vol. 44, pp. 485-494 (1930). [Chemical Abstracts, Vol. 25, p. 1309; March 20, 1931.]

Copper is taken almost daily into the system with the food and is essential to the diet. Although it accumulates in the system to a certain extent, no resulting injury has been observed. It would be almost impossible to take a toxic dose because of its taste and the sickness which it would produce. The use of copper pipe even in an acid water or the use of copper sulphate in reservoir treatment should cause no anxiety.

WHAT'S ON YOUR MIND?

Political Sewage Disposal

To the Editor of FOOD INDUSTRIES:

Above Minneapolis and St. Paul it is the Mississippi River; just below these cities it is from 1 to 20 per cent sewage, depending on seasonal variation in river flow. The Minnesota State legislators, having finished their biennial fight over what to do about it, have again hung up their swords in the Capitol building and returned to their plowshares, leaving the Mississippi and the sewage to flow as they will. The citizenry of Minneapolis, accused of blocking legislation, have swelled with civic pride and undertaken a permanent tax program to provide for sewage treatment. Several meat packers are contributing 25 per cent of the total pollution, and wondering if they may continue with no expense, or be exorbitantly taxed.

As early as 1888, Dr. William Watts Folwell, late president emeritus of the University of Minnesota, is said to have referred to the policy of emptying sewage from the Twin Cities into the river as being so deplorable as "to make angels weep and men blaspheme." Whether or not angels have been shedding tears these 40 years is a matter of conjecture, but among men there has been a great outpouring of argument.

The Minnesota State Board of Health called the attention of the city councils of St. Paul and Minneapolis to the situation in 1923. Organized fishermen and residents of sewage-scented districts voiced their protests against uncontrolled pollution from time to time. And in 1927, the state Legislature created a commission to study the subject. By this time there was a project for the erection of the dam across the river at Hastings, 30 miles below the cities. It was evident that this dam would make the river a mammoth septic tank as far back as Minneapolis, and that therefore South St. Paul with its meat-packing plants, below the cities, but above the dam, must be included in any project for sewage treatment. The commission made an exhaustive study of the situation, and suggested plans for sewage treatment for the entire metropolitan area. The Minnesota Legislature in 1929 heard little objection to compulsory sewage treatment, but failed to pass any bills on the subject, because of disagreement as to apportioning costs.

Minneapolis newspapers, politicians, and professional civic leaders viewed with the customary alarm the status of South St. Paul, with property assessed at less than 2 per cent of the total for the three cities, but contributing 9 per cent of the total sewage volume, and this so strong as to constitute 25 per cent of the total pollution. Distribution of sewage-treatment costs on a basis of assessed valuation, they said, would be extremely unfair to Minneapolis and St. Paul. Spokesmen for St. Paul, perhaps because of closer proximity to South St. Paul, or possibly to keep up the tradition of always disputing with Minneapolis, did not follow the lead of the other city in this argument, but would accept any proposition agreed upon by Minneapolis and South St. Paul.

South St. Paul, with its industrial population of only 10,000, has not felt particularly concerned about the river pollution. However, in a spirit of cooperation, it expressed a willingness to be included in any metropolitan scheme for sewage treatment having an equitable basis of cost apportionment. As a concession to the vociferations of Minneapolis, the meat-packing town even offered to participate on a straight volume basis instead of the more universal one of assessed valuation. Minneapolis' insistence that this community be admitted only on a pollution basis was branded as unjust, discriminatory, and in effect confiscatory.

It was pointed out that large industries usually locate on rivers offering a convenient outlet for sewage, and in this connection was quoted a statement of the Minnesota State Board of Health that "one of the most important uses of a stream is to care for liquid wastes of a community." These were important considerations in the selection of South St. Paul as a site for the packing plants at a time when river navigation was negligible and when no development of the same was anticipated. This site, several miles downstream from the cities, has insured freedom from nuisance for many years, and would so have continued except for the construction of the new dam. It appeared to the South St. Paul people that those who dammed the river were responsible for making sewage treatment necessary in their community.

An attempt was made to reach an agreement on distribution of sewage-treatment costs before the state legislature convened in 1931. Discussions were held in meetings of innumerable associations and societies, ranging from the Taxpayers' Association of Minneapolis to the Hook-Em-Cow Club of South St. Paul. But attempts at unanimity of opinion were fruitless.

It became necessary, therefore, for the legislators to make a decision. While the Hastings dam was being put into operation, and the river filling up with quiet water, they attacked the problem with earnestness. They gave ear to expert engineers, expert rhetoricians, expert visionaries. The delegates from St. Paul were readily convinced that the established custom of payment in proportion to property assessment was adequate. The rural legislators, recognizing that the slaughter houses were paying their constituents $155,000,000 annually for livestock, saw no valid reason for penalizing the packers. Legislators from Minneapolis found themselves hopelessly outnumbered, but continued their struggle through the final day of the legislative session. Finally a bill was passed providing for a single sewage-treatment plant for the entire area, to be paid for proportionally to assessed valuation of property.

Minneapolis, however, found a staunch defender in the person of Governor Olsen. He returned the bill to the Legislature one hour before the time set for its adjournment. His reasons for declining to sign the bill, although advancing no new arguments, took up the greater part of the remaining hour. The lawgivers, overcome by surprise and fatigue, made an unsuccessful attempt to pass the bill over the Governor's veto, and adjourned without further action.

Editorial comment by the various newspapers, following the adjournment of the Legislature, was most interesting. Very generally the Minneapolis papers commended the Governor for his fearless stand against the "Packers' Bill." The pork-packing interests were accused of maintaining a very active lobby to expound the merits of the St. Paul bill, prepared to furnish to any wavering legislator "as much mental and physical stimulus as he thought he needed." St. Paul papers, on the other hand, accused the Governor and Minneapolis of blocking attempts to solve a critical problem.

Minneapolis refuted this charge on June 8 by passing with an overwhelming popular vote a tax levy on all property of 2½ mills for the next ten years with a subsequent tax of 1 mill. This tax is to pay for construction and operation of new sewers and a sewage-treatment plant either for Minneapolis alone or in conjunction with St. Paul. While awaiting the decision of St. Paul, work will commence on the necessary sewage interceptors, giving employment to 1,000 men during the fall and winter. It is expected by many that St. Paul will join Minneapolis in this venture, and that the State Board of Health may then require South St. Paul to clean up its sewage if it does not voluntarily offer to do so. This would make it necessary for the packers to pay the entire cost of treating their sewage. They might pipe it to the Minneapolis-St. Paul plant, paying for treatment there, or build a plant jointly at South St. Paul, or each maintain its own plant.

The packers presumably are prepared, in case this situation should present itself, for their engineering departments have been engaged in investigational work along this line for many years. In this connection, however, it is interesting that of the several methods of treating packing-house sewage, no two treatment plants are in any wise similar, from which it may be inferred that no method has aroused enthusiasm.

From the controversy centering about South St. Paul, river-polluting industries may ultimately expect at least a definition of their responsibilities, and possibly some valuable contributions to the science of treating industrial sewage.

June 11, 1931. A. E. ROBE.

BOOK REVIEWS

THE LITERATURE OF THE MEDICAL PROFESSION AND ALLIED SCIENCES CONCERNING FOOD. Compiled by Research and Control Laboratories of the Van Camp Packing Co., Indianapolis, Ind. 31 pp. (including bibliography), 6x9; paper.

IN A STYLE that suggests the compilations of contemporary opinion in the *Literary Digest,* but without the controversial aspects of that publication, Dr. G. A. Fisher and his associates of Van Camp's have assembled an interesting group of excerpts and quotations from contemporary—in fact very recent—scientific literature on the subject of nutrition. Although this assembly of quotations is taken from 63 sources, without any intrusions or explanations by the compilers, it has been so handled that it becomes a well-organized composite essay on the newer knowledge of nutrition. The rôle of minerals, metals, and vitamins is concisely portrayed, with a good background of the broader aspects of nutrition.

This is the sort of publication that we should like to have handy to fire at pestiferous food faddists who find it much more easy to cling to an obsession or to a superstition than to dig up the real facts for themselves. If this pamphlet, which has for its purpose the justification of Van Camp's Pureed Foods, has the reception one anticipates it will have, Dr. Fisher will have a constantly increasing task ahead of him as the years go by. When the first revision is made, a year or so hence, it should be given something simpler than its present cumbersome eleven-word title.

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BRITISH GOVERNMENT REPORTS

The following official publications of British Department of Scientific and Industrial Research, 16 Old Queen St., Westminster, London, S. W. 1, regarding food and food investigations are obtainable from the British Library of Information, 551 Fifth Ave., New York City.

Report of the Food Investigation Board Department of Scientific and Industrial Research for the year 1929—Includes special reports on changes in fresh and cured meats and fruit; special studies on eggs, canned goods, fish, and general food problems; and an appendix listing reports and papers published or submitted for publication during 1929. 146 pp., 6x9⅝; 24 tables, 54 figures; paper. Price, 2s. 6d. net.

The Thermal Properties of Ethyl Chloride—Special Report No. 14 (1923) by the Engineering Committee of the Food Investigation Board. 36 pp., 6x9⅝; 3 tables, 25 figures; paper. Price, 1s. 6d. net.

The Thermal Properties of Methyl Chloride — Special Report No. 19 (1924) by the Engineering Committee of the Food Investigation Board. 16 pp., 6x9⅝; 3 tables, 6 figures; paper. Price, 1s. net.

Index to the Literature of Food Investigation—Vol. 2, No. 1; March, 1930; 108 pp., 6x9⅝; paper. Price, 2s. net. Vol. 2, No. 2; September, 1930; 90 pp., 6x9⅝; paper. Price, 2s. net.

The "Gas" Content and Ventilation of Refrigerated Holds Carrying Apples—Special Report No. 21 (1925) by Food Investigation Board. 42 pp., 6x9⅝; 17 illustrations; paper. Price, 1s. 3d. net.

The Handling and Transport of Fish—Special Report No. 25 (1925) by Food Investigation Board. 25 pp., 6x9⅝; 12 figures; paper. Price, 9d. net.

Gas Storage of Fruit—Special Report No. 30 (1927) by Food Investigation Board. 88 pp., 6x9⅝; 13 tables, 7 temperature record charts, 15 figures; paper. Price, 1s. 9d. net.

The Control of Reaction in Cultures and Enzymic Digests—Special Report No. 32 (1928) by Food Investigation Board. 28 pp., 6x9⅝; 4 tables. 11 charts; paper. Price, 9d. net.

A Critical and Historical Study of the Pectic Substances of Plants—Special Report No. 33 (1929) by Food Investigation Board. 154 pp., 6x9⅝; 9 figures; paper. Price, 3s. 6d. net.

The Leakage of Heat Into Ships' Insulated Holds—Special Report No. 34 (1929) by Food Investigation Board. 34 pp., 6x9⅝; 11 tables, 2 figures; paper. Price, 1s. net.

Heat Insulators—Special Report No. 35 (1929) by Food Investigation Board. 96 pp., 6x9⅝; 48 tables, 37 figures; paper. Price, 2s. 6d. net.

Postmortem Changes in Animal Tissues: The Conditioning or Ripening of Beef—Special Report No. 36 (1929) by Food Investigation Board. 64 pp., 6x9⅝; 19 tables, 25 figures; paper. Price, 2s. net.

Wastage in Imported Fruits: Its Nature, Extent, and Prevention. Special Report No. 38 (1930) by Food Investigation Board. 72 pp., 6x9⅝; 9 plates, 14 tables, 5 figures; paper. Price, 1s. 6d. net.

The Prevention of Wastage in New Zealand Apples—Special Report No. 39 (1930) by Food Investigation Board. 26 pp., 6x9⅝, 15 tables, 11 figures, paper. Price, 6d. net.

The Corrosion of the Tin-Plate Container by Food Products—Special Report No. 40 (1931) by Food Investigation Board. 85 pp., 6x9⅝, 18 tables, 29 figures, paper. Price, 1s. 6d. net.

The Antiscurvy Vitamin in Apples—Special Report Series No. 146 (1930) by Privy Council Medical Research Council, 38 Old Queen St., Westminster, London, S.W. 1. 54 pp., 6¼x9⅞, 6 tables, 33 charts; appendix giving list of Medical Research Council Publications; paper. Price, 9d. net.

The Demand for Cheese in London—Report No. 22 (November, 1929) by Economic Section of the Empire Marketing Board, 2 Queen Anne's Gate Buildings, London, S.W. 1. 32 pp., 7⅜x9¾; 11 tables; paper. Price, 1s. net.

Canadian Fruit Shipments—Report No. 30 (June, 1930) by the Economic Section of Empire Marketing Board, 2 Queen Anne's Gate Buildings, London, S.W. 1. 66 pp., 7⅜x9¾; 14 tables; paper. Price, 1s. net. Report of an investigation into the deterioration in transit of Canadian Fruit imported into United Kingdom, 1927-29, also contains list of Empire Marketing Board publications.

The Demand for Canned Fruits—Report No. 37 (March, 1931) by the Economic Section of Empire Marketing Board, 2 Queen Anne's Gate Buildings, London, S.W. 1. 46 pp., 7⅜x9¾; 19 tables, 2 figures; paper. Price, 1s. net. Report of an investigation into retail marketing of canned fruits in the United Kingdom.

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GOVERNMENT PUBLICATIONS

DOCUMENTS ARE AVAILABLE *at prices indicated from Superintendent of Documents, Government Printing Office, Washington, D. C. Send cash or money order; stamps and personal checks not accepted. When no price is indicated, pamphlet is free and should be ordered from bureau responsible for its issue.*

Tariff Commission Reports. Two documents in the Second Series of the Commission's reports to the President, as follows: No. 1, Differential between Raw and Refined Sugar, 5 cents; and No. 9, Maple Sugar and Maple Sirup, 5 cents.

Chemical Eradication of Ribes, by H. R. Offord. U. S. Department of Agriculture, technical bulletin 240. 10 cents. Describes use of sodium chlorate and related chemicals.

Beef Production and Quality, by W. H. Black and K. F. Warner. U. S. Department of Agriculture, technical bulletin 217; 15 cents. Discusses the effect of grade of steer and feeding grain supplement on grass.

Beef Cattle Industry of Virginia, by C. A. Burmeister and others. U. S. Department of Agriculture, technical bulletin 237; 10 cents. An economic discussion.

Variety Tests of Sugarcanes, by G. Arceneaux and R. T. Gibbens. U. S. Department of Agriculture, circular 162; 5 cents. Relates to the crop year 1928-1929 in Louisiana.

Menhaden Fish Oil for Animal Feeding, by R. W. Harrison and S. R. Pottinger. Bureau of Fisheries, investigational report No. 4; 5 cents. Discusses commercial production.

Oleomargarine Tax Regulation. Treasury Decision 4313, amending regulations in accordance with the Congressional Act of March 4, 1931; mimeographed.

Tomato Juice and Tomato Cocktails. Bureau of Foreign and Domestic Commerce Foodstuffs Division, mimeographed production survey.

Filberts. Bureau of Foreign and Domestic Commerce Foodstuffs Division, mimeographed summary of general information.

PATENT DIGEST

Baking and Milling

Doughnut Forming Machine — John C. Bergner, Philadelphia, Pa., to Doughnut Machine Corp., New York, N. Y. No. 1,793,207. Feb. 17, 1931.

Pretzels Made on Looping and Twisting Machine—Claude D. Reed, Lebanon, Pa. No. 1,793,374. Feb. 17, 1931.

Pastry Shells Filled by Coordinated Operation Machine—Earl R. Johnston, Pittsburgh, Pa. No. 1,795,307. March 10, 1931.

A Reciprocable-Acting Feed Mechanism for Bake Ovens—Chester A. Sundbom to Baker Perkins Co., Inc., Saginaw, Mich. No. 1,795,352. March 10, 1931.

Bread Slicing Machine With Rotary Knife and Gage Plate to Regulate Slice Thickness—William J. Campbell, Indianapolis, Ind., to American Slicing Machine Co., Chicago, Ill. No. 1,795,931. March 10, 1931.

Pectin Used in Baking of Sweet Goods—Arnold S. Wahl to E. W. Stewart & Co., Chicago, Ill. No. 1,795,980. March 10, 1931.

Dough Divided and Molded on Machine With a Spherical Working Surface Molding Plate — Karl Hildmar, Hoffman, Benditz, Germany. No. 1,796,102. March 10, 1931.

Indirect Irradiation of Food Products in Baking Oven Fitted With a Mercury Vapor Lamp and Reflector—Albert Wörner, Stuttgart-Cannstatt, Germany. No. 1,796,134. March 10, 1931.

Mechanized Slicing and Buttering of Bread—Walter Steinkellner, Vienna, Austria. No. 1,796,412. March 17, 1931.

Doughs Shaped Into Cylindrical Rolls With Closed Ends by Labor-Saving Machine—Walter H. Eseman, Beverly Hills, Calif., to Franco-American Baking Co., Los Angeles, Calif. No. 1,796,922. March 17, 1931.

Device for Perforating Top Crust of Pies With Predetermined Design — Frederick Lewis Brown, West Palm Beach, Fla. No. 1,797,070. March 17, 1931.

Molding Unit for Cone-Baking Machines—Oscar Hange, San Mateo, Calif., to National Biscuit Co., New York City. No. 1,797,086. March 17, 1931.

Gas Heated Traveling Plates Thermostatically Controlled to Maintain a Uniform Baking Temperature—Joseph Henry Bates, Liverpool, England. No. 1,798,515. March 31, 1931.

Adjustable Doughnut-Forming Machine—John Christian Bergner, Lansdowne, Pa., to Doughnut Machine Corp., New York, N. Y. No. 1,798,582. March 31, 1931.

Traveling Conveyor That Automatically Empties Biscuit Pans—Henry Devlin to Baker Perkins Co., Inc., Saginaw, Mich. No. 1,798,728. March 31, 1931.

Bread Slicing Machine—Leslie A. Riddell, Winnipeg, Manitoba, Canada. No. 1,799,249. April 7, 1931.

Combination Power Mixer and Receiving Troughs for Handling Doughs—Frank X. and Edward J. Lauterbur, Sidney, Ohio. No. 1,799,520. April 7, 1931.

Dough Molding Machine—Frank H. Van Houten to Dutchess Tool Co., Beacon, N. Y. No. 1,800,417. April 14, 1931.

Dough Divider and Rounder—Frank H. Van Houten to Dutchess Tool Co., Beacon, N. Y. No. 1,800,418. April 14, 1931.

Square Wafer Blanks Mechanically Formed Into Cornets — Curt Winzer, Halbertstadt, Germany. No. 1,800,852. April 14, 1931.

Slicing Machine With Support for Product Moving Past Edge of Knife in Plane Parallel to Plane of Knife Edge—Joseph Folk to U. S. Slicing Machine Co., La Porte, Ind. No. 1,800,861. April 14, 1931.

Confectionery

Frozen Confection Consisting of Cake Ring Filled With Ice Cream—Max Baker, Washington, D. C. No. 1,802,306. April 21, 1931.

Doughnut-Shaped Confectionery Shell With Filling—Frank E. Blanchard, Chicago, Ill. No. 1,802,698. April 28, 1931.

Ball Beater Type of Candy Mixer With Rotating Plows and Rollers or Guides—Frederick J. Biese to Dayton Specialty Machine Co., Dayton, Ohio. No. 1,797,753. March 24, 1931.

Molds on Continuous Conveyor to Hold and Agitate Confectionery Solids While Coating Is Being Applied to Form Candy Bars Which Are Discharged When Molds Are Inverted—Emil G. Bremer, Burlington, Iowa. No. 1,797,818. March 24, 1931.

Tails on Machine Deposited or Coated Sweetmeats Severed and Removed Mechanically by Endless Cable—Max Marc Guggenheim, Cambridge, Mass., to Baker Perkins Co., Inc., Saginaw, Mich. No. 1,798,731. March 31, 1931.

Soft Centered Confection Formed Into Continuous Elongated Mass, Cut Into Chips or Pillow-like Lengths, and Sealed on Ends—Eseck C. Miller, Newark, N. J., to Morris Kirschstein, New York City. No. 1,800,695. April 14, 1931.

Edible Emulsion of Chocolate Prepared by Use of Gelatin—Lewis B. Esmond, Boston, Mass., and Werner W. Duecker, Pittsburgh, Pa. Nos. 1,800,985, 1,800,986, and 1,800,987. April 14, 1931.

Confections Coated and Decorated Mechanically by Correlating Performances of Decorating Apparatus With Those of Coating Machine—Edward C. Becht, Newport, Ky. No. 1,801,992. April 21, 1931.

Canning and Glass Packing

Can Packer With Hopper Mounted on Pivot to Deliver Cans Endwise Into Cases—Royal Douglass, South Bellingham, Wash. No. 1,793,595. Feb. 24, 1931.

Cans Automatically Removed From Trays for Cooling—Royal Douglass, South Bellingham, Wash. No. 1,793,596. Feb. 24, 1931.

Can With a Tearing-Strip Removable Top With Discharge Opening in Inner Lining Adjustable Into and From the Tearing Strip Opening—Lynn A. Robinson, one-half to Richard J. Cook, Seattle, Wash. No. 1,793,636. Feb. 24, 1931.

Bottles in Wire-Bottomed Crates Filled and Capped by Machine — Arthur Guy Enock, Wembley Park, England, to Burlectas, Ltd., London, England. No. 1,794,005. Feb. 24, 1931.

A Metal Bottle-Cap That Seals by an Overlap Clamping Action — Charles H. Butcher, Cambridge, Mass. No. 1,795,289. March 10, 1931.

Can Opener With Rotating Cutter That Follows Bead of Can and Is Lever Operated—Sewell W. Davis to Polly Wiggin, Inc., Newark, N. J. No. 1,795,478. March 10, 1931.

Can Sealed by Engaging Rolled Flange Cover With Half-Roll Can Edge Through Pressure—John M. Hothersall, Brooklyn, N. Y., to American Can Co., New York City. No. 1,795,489. March 10, 1931.

Bottles in Portable Crates Cleaned by Machine That Automatically Raises Bottles Into Contact With Overhead Brushes—Arthur Guy Enock, Wembley Park, England, to Burlectas, Ltd., London, England. No. 1,795,545. March 10, 1931.

Replaceable Aluminum Seal for Bottles and the Like—John E. Sharp, New Kensington, Pa., to Aluminum Co. of America, Pittsburgh, Pa. Nos. 1,796,728 and 1,796,729. March 17, 1931.

Can Opener That Holds Can Rigid During Opening Operation—Armen Potigian, Davenport, Iowa. No. 1,796,807. March 17, 1931.

Machine for Putting Screw Caps on Containers by Revolving Containers in Relation to Cap Held Stationary—Robert G. Clark, Brooklyn, N. Y., to Anchor Cap & Closure Corp., Long Island City, N. Y. No. 1,797,679. March 24, 1931.

Can Body Forming Machine — Martin August Seaholm, Chicago, Ill. No. 1,798,439. March 31, 1931.

Can Opener Consisting of Two Arms Pivoted to Operate a Cutter Along Inner Side of Can and Driving Roller on Outer Edge — Yasuhiko Nagano, Los Angeles, Calif. No. 1,802,443. April 28, 1931.

Can Opener That Manually Rotates Can in Relation to a Pivoted Curved Cutting Device—Eugene Seavey, New York City. No. 1,798,988. March 31, 1931.

Can-Feeding Mechanism of Horizontally Rotating Disk Design—Robert B. Metzner, Wheeling, W. Va., to Continental Can Co., Inc., New York City. No. 1,799,857. April 7, 1931.

Dairy and Egg Products

Putting Liners in Teat Cups—Martin Bernard Bengtson, Stockholm, Sweden, to The De Laval Separator Co., New York City. No. 1,793,454. Feb. 24, 1931.

Heat Interchanger for Regulating Temperature of Milk—Cornelius Mortensen, Louisville, Ky. No. 1,793,631. Feb. 24, 1931.

Twin-Section Folding Egg Cartons—Leon Sugerman to Leon Benoit, Chicago, Ill. Nos. 1,794,124 and 1,794,125. Feb. 24, 1931.

Ice Cream Cone With Cover of Edible Material—Robert E. McKibben, Pittsburgh, Pa. No. 1,794,238. Feb. 24, 1931.

Refrigerated Hopper to Receive and Hold Contents of Plural Number of Ice Cream Freezers Until Delivery Is to Be Made to a Lower Outlet—Julius J. Mojonnier to Mojonnier Bros. Co., Oak Park, Ill. No. 1,794,387. March 3, 1931.

A Discharge Mechanism for Delivering Ice Cream From a Supply System to Containers by Means of Oscillating Valve and Cylinder Piston Action—Julius J. Mojonnier and Harley R. Phillips to Mojonnier Bros. Co., Oak Park, Ill. No. 1,794,388, March 3, 1931; and No. 1,795,312, March 10, 1931.

Milk Pasteurizer and Holding Tank With Shaft and Stuffing Box Capable of Being Cleaned and Sterilized—Fritz G. Cornell, Jr., Caldwell, N. J., to Jensen Creamery Machinery Co., Bloomfield, N. J. No. 1,795,932. March 10, 1931.

Ice-Cream Can for Dispensing Purposes Divided Into Sections by Radial Partitions and Subdivided Vertically to Form Compartments—Elmer C. Epple, Marietta, Ohio. No. 1,795,849. March 10, 1931.

Cheese Processed by Treating With Steam in a Continuous Type Operation—Charles and Henry H. Doering, Chicago, Ill. No. 1,796,445. March 17, 1931.

Heat Interchange System for Treating Milk—Charles E. North, Montclair, N. J., to The Creamery Package Manufacturing Co., Chicago, Ill. No. 1,796,577. March 17, 1931.

Continuous Operation Method of Candling Eggs—John W. Wyland, San Gabriel, Calif. No. 1,796,699. March 17, 1931.

Gas Removed From Cream During Pasteurization by Agitating Cream in Contact With Moving Air—Oliver V. Jones, Webster Groves and Alvin Schneider, St. Louis, Mo. No. 1,796,951. March 17, 1931.

Milk-Treatment Tank With Spirally Corrugated Inner and Outer Walls to Give Increased Contact Area and More Uniform Agitation of Temperature-Regulating Medium—Edgar B. Nichols, Rochester, N. Y. No. 1,797,014. March 17, 1931.

Heat Interchanger of Concentric Tube Type for Preheating Milk—Ralph B. Bagly, Chicago, Ill. No. 1,797,312. March 24, 1931.

Bulk Ice Cream Packed Into Hollow Cylindrical Form to Facilitate Dispensing in Small Block Form—Edward L. Hatcher, Tiffin, Ohio. No. 1,797,417. March 24, 1931.

Sterilization of Milk in a Heated Apparatus Fitted With a Rotating Means of Delivering Liquid Food Materials Into Apparatus and Treating With Steam Forced Through Multiple Jets—George Grindrod, Oconomowoc, Wis., to Grindrod Process Corp., Waukesha, Wis. Nos. 1,797,769 and 1,798,120. March 24, 1931.

Milk Taken and Held Under Vacuum to Give High Vitamin and Low Bacteria Content—Roy R. Graves, Kensington, Md. No. 1,798,413. March 31, 1931.

Sour Milk Product Made From Milk, 1 Per Cent Concentrated Tomato Juice, and 1 Per Cent Lacto-bacillus Acidophilus Culture—Walter L. Kulp, New Haven, Conn. No. 1,799,303. April 7, 1931.

Butter Worked by Rotating Worm Screw Mechanism Operating in a Continuous Manner—Charles and Henry H. Doering, Chicago, Ill. No. 1,799,504. April 7, 1931.

Plunger Type Ice Cream Scoop That Fills and Empties by Reciprocating Action of Plunger Disk—Lowell M. Lawrence, New Rockford, N. D. No. 1,799,827. April 7, 1931.

Clamp Device to Connect Cylindrical Ice Cream Cans and Hold Them in Relatively

Stable Position—Milton Selig to I. Fischman & Sons, Philadelphia, Pa. No. 1,800,109. April 7, 1931.

Cream and Ice Cream Mix Filtered Through Upright Cylindrical Screen Surfaces—John J. Schlosser, Frankfort, Ind. No. 1,800,757. April 14, 1931.

Cheese Carton With Thin Sheet-Like Wood Liner—Herbert E. Cooley, West Bend, Wis. No. 1,800,816. April 14, 1931.

General Processes

Strontium Chloride and Ammonium Nitrate Mixture as Absorbents for Ammonia Refrigerant—Ralph M. Buffington to Frigidaire Corp., Dayton, Ohio. No. 1,792,628. Feb. 17, 1931.

Coffee Beans and the Like Washed by Means of an Inclined Screw Conveyor Submerged in Wash Solution—Max Aya, London, England. No. 1,796,856. March 17, 1931.

Air Conditioned by Spray Application of Secondary Refrigerant Cooled by Contact With Coils Containing Primary Refrigerant—Samuel C. Bloom, Chicago, Ill. No. 1,796,859. March 17, 1931.

Electrolytic Precipitation and Sterilization of Solids in Juices Obtained From Residues of Extracted Malt Grain—Margaret M. Koller, Elmhurst, Ill. No. 1,799,142. March 31, 1931.

Removal of Oil From Soy Beans by Solvent Action in Rotating Drum Which Permits Removal of Solvent Vapor—Teikichi Satow, Tokyo, Japan, No. 1,799,256. April 7, 1931.

Sugar and Molasses

Small Units of Comb Honey Prepared in Merchandisable Form From Larger Units—Erwin H. Reif, Kalona, Iowa. No. 1,797,021. March 17, 1931.

Cane Slicer and Leveler Attachment for Sugar-Mill Rolls—Culbert James Pender, Lautoka, Fiji Islands. No. 1,797,673. March 24, 1931.

Sugar Factory Residues Processed for Fertilizer Purposes—Zdenko Metzl, Paris, France, to Société Anonyme: Selbi, Société d' Exploitation de Licenses de Brevets Industriels, Geneva, Switzerland. No. 1,799,176. April 7, 1931.

Reactions Between Sucrose and Quicklime Regulated in Battery-like Reaction Tank—Ralph W. Shafor, Denver, Colo. No. 1,800,667. April 14, 1931.

Molasses Distributor for Feed Mixing Equipment—Robert R. Norwood, Mineral Wells, Tex. No. 1,802,061. April 21, 1931.

Fruits and Vegetables

Date Pitting Mechanized — Albert K. Smith, West Orange, N. J., to The Hills Brothers Co., Inc., New York City. No. 1,794,479. March 3, 1931.

Apples Picked by Controlled Knife on Pole and Delivered Through Fabric Tube to Receiver Convenient to Operator—Abbie A. Hardwick, Spokane, Wash. No. 1,795,392. March 10, 1931.

Nuts Picked Mechanically From Moving Conveyor Belt.—Frank A. Coari, Chicago, Ill. No. 1,795,476. March 10, 1931.

Fruit Counter With Rotating Element Designed to Engage Single Fruit Unit and, as it Rotates, Register Passage of Each Fruit Unit Down the Passageway—William C. Scheu, Uplands, Calif., and Joseph H. Hemmerly, Pomona, Calif., to Scheu Manufacturing Co. No. 1,795,511. March 10, 1931.

Pimento Peppers Cured by Passing Through Heated Chamber on Conveyor Fitted With Perpendicular Supports for the Peppers—Walter Louis Graefe, Griffin, Ga. No. 1,797,140. March 17, 1931.

Citrus Fruit Treated With Sodium Aluminate to Prevent Decay—Harry R. Fulton and John J. Bowman, Washington, D. C. No. 1,797,572. **With Manganese Sulphate.** No. 1,797,573. March 24, 1931.

Peas Forced Out of Pods by Oppositely Revolving Rolls—Frank Kodama, New York City. No. 1,798,543. March 31, 1931.

Oil Expressed From Peels of Citrus Fruits by Applying Pressure to Reverse Side of Peel Lying With Oil-Bearing Side on Porous Surface — Wilbur A. Pipkin, Safety Harbor, Fla. No. 1,798,555. March 31, 1931.

Fresh Fruits and Vegetables Preserved by Treating With Gaseous CO_2 During Chilling Operations — Charles Brooks, East Falls, Church, Va., to public use. No. 1,798,781. March 31, 1931.

Pectin Solution Obtained From Apple Pomace by Adding 10 Per Cent of Hot Water and Subjecting to Hydraulic Pressure—Elton R. Darling, Decatur, Ill., and Howard F. MacMillin, Mount Gilead, Ohio, to The Hydraulic Press Manufacturing Co., Mount Gilead, Ohio. No. 1,799,140. March 31, 1931.

Boxed Fruit Protected by Flexible-Board Guard Bent to Engage Sides and Ends of Fruit Box—George D. Bishop to Crown Paper Co., Sanford, Fla. No. 1,799,497. April 7, 1931.

Cored Fruit Held on Roasting Mechanism by Friction on Cored Surface—Albert K. Smith, West Orange, N. J., to The Hills Brothers Co., Inc., New York City. No. 1,799,571. April 7, 1931.

Fruit Picker With Pivoted Knife to Release Fruit and Means of Controlling Its Fall to Receiver—Morris Coleman, Lynn, Mass. No. 1,799,887. April 7, 1931.

Oil Removed From Pulp of Olives and Other Fruit by Centrifugal Action—Henri Bernier, Oakland, Calif., to California Packing Co., San Francisco, Calif. No. 1,800,336. April 14, 1931.

Edible, Gum-like, Hydroscopic Colloid Added to Fruit Juices as Aid to Drying—Carl Böhm V. Börnegg, Frankfort-on-the-Main, Germany, to California Fruit Growers' Exchange, Los Angeles, Calif. No. 1,800,501. April 14, 1931.

Fruit Gathered by Aid of Conical Tent-like Structure That Fits About the Tree Trunk to Break Fall of Fruit and Direct Fruit to Discharge Openings at Edge—George W. Helsel, Columbus, Ohio. No. 1,800,272. April 21, 1931.

Mechanical Grape Huller — William J. Stover, Fruitland Park, Fla. No. 1,802,225. April 21, 1931.

Artichoke-Coring Machine — George D. Gardner to Barron Gray Packing Co., San Jose, Calif. No. 1,802,972. April 28, 1931.

Copies of Patents

Complete specifications of any United States patent may be obtained by remitting 10c. to the Commissioner of Patents, Washington, D. C.

Photostatic copies of foreign patents may be obtained at the same address, prices being forwarded on application.

Copies of patents should be ordered by number, as titles used in this digest seldom correspond with title of patent.

General Equipment

Driving Mechanism for Slicing Machines With Two Rotating Knives — Cornelis Franciscus Maria van Berkel, Wassenaar, Netherlands, to U. S. Slicing Machine Co., La Porte, Ind. No. 1,791,769. Feb. 10, 1931.

Driving Mechanism for Slicing Machines With Single Control for Clutches Operating Slicing Knife and Feeding Carriage—Jetze Van Hoorn, Voorburg, Netherlands, to U. S. Slicing Machine Co., La Porte, Ind. No. 1,791,770. Feb. 10, 1931.

Adjustable Floor Drain—David S. Williams, Portland, Ore. No. 1,792,345. Feb. 10, 1931.

Refrigerator Display Case With Cooling Coils Under an Elevated Display Surface in Rear of Case—Charles B. Longstreth, Denver, Colo. No. 1,792,748. Feb. 17, 1931.

A Twin-Unit Filling, Weighing and Package Closing Machine—Paul Gaugler, Esslingen, Germany, to Firm Fr. Hesser, Maschinenfabrik-Aktiengesellschaft, Stuttgart, Cannstatt, Germany. No. 1,794,010. Feb. 24, 1931.

Iron-Bound Platform for Lift Truck Work—Arthur M. Barrett to Barrett-Cravens Company, Chicago, Ill. No. 1,794,665. March 3, 1931.

Water Level in Boiler Kept Constant by a Float Control Valve Actuating the Main Valve to Keep Pressure of Water in Float Chamber Under Pressure — James George Weir to G. & J. Weir, Limited, Glasgow, Scotland. No. 1,795,190. March 3, 1931.

A Sharp Curve Roller Conveyor—Phineas Hiram York, Indianapolis, Ind., to Logan Co., Louisville, Ky. No. 1,795,192. March 3, 1931.

Oyster Dredge Having Wider Top Frame Than Bottom Frame—Boyd and Charles Fagan, Bivalve, N. J. No. 1,795,768. March 10, 1931.

Sturdily Built Portable Skid for Lift Truck Use—William Stuebing, Jr., Cincinnati, Ohio, to The Yale & Towne Manufacturing Co., Stamford, Conn. No. 1,796,128. March 10, 1931.

Rack With Chute and Holder for Facilitating Filling of Bags—Calvin A. Hester to Guaranty Trust Co., Yakima, Wash. No. 1,796,288. March 17, 1931.

Colorimeter With Opaque Side Walls and Means for Diffusing Light From Bottom End of Tube and for Flattening Meniscus at Surface of Liquids Under Examination—John C. Baker, Montclair, N. J. and Charles F. Wallace, Westfield, N. J., to Wallace & Tiernan Products, Inc., Belleville, N. J. No. 1,794,134. Feb. 24, 1931.

Slicing Machine With Rotary Knife, Removable Guard Plate, and a Direct Motor Drive—William J. Campbell, Indianapolis, Ind., to American Slicing Machine Co., Chicago, Ill. No. 1,797,045. March 17, 1931.

Steam Trap With a Sealed Flexible-Acting Capsule Actuated by the Internal Vapor Pressure of a Benzene and Alcohol Mixture—David N. Crosthwait, Jr., Marshalltown, Iowa, and Clayton A. Dunham, Glencoe, Ill., to C. A. Dunham Co., Marshalltown, Iowa. No. 1,797,258. March 24, 1931.

Slicing Machine With Slicing Knife and Means for Moving Material to Be Sliced to Knife by a Rotating and Oscillating Support for the Material—Cornelis F. M. van Berkel, Wassenaar, Netherlands, to U. S. Slicing Machine Co., La Porte, Ind. No. 1,798,112. March 24, 1931.

Slicing Machine With Rotary Knife and Means of Holding Several Units to Be Sliced on Carriage That Moves in Reciprocating Relation to Knife—Wilhelmus A. Van Berkel, Montreux, Switzerland, to U. S. Slicing Machine Co., La Porte, Ind. No. 1,798,113. March 24, 1931.

Pressure Cookers — Joseph H. Jacobs, Rochester, N. Y. Nos. 1,779,905 and 1,799,906. April 7, 1931.

Slice Receiver for Slicing Machine With Upright Slicing Knife—Hugh Donald Fitzpatrick, Glasgow, Scotland, to U. S. Slicing Machine Co., La Porte, Ind. No. 1,801,599. April 21, 1931.

Electrically Driven Slicing Machine With Common Handle for Operating Switch and Clutch That Controls Motor and Other Operating Parts — Henry Thomas, East Ham, London, England, to U. S. Slicing Machine Co., La Porte, Ind. No. 1,801,649. April 21, 1931.

Method and Equipment for Wrapping Sliced Foodstuffs — Cornelis F. M. van Berkel, Wassenaar, Netherlands, to U. S. Slicing Machine Co., La Porte, Ind. No. 1,801,650. April 21, 1931.

Packaging Machine That Delivers Into Carton and Shifts Carton When Filled—Garrett W. Mudd, Chicago, Ill., to Standard Sealing Equipment Corp., New York City. No. 1,803,123. April 28, 1931.

Meat Packing

Meat Recovered From Backbones of Fishes by Flexible Rollers Operating Under Pressure—Anton Peters, Everett, Wash. No. 1,793,189. Feb. 17, 1931.

Meat Molded and Held for Smoking Treatment in Clamped Open-Mesh Containers—Hans Kock, Boise, Idaho. No. 1,794,304. Feb. 24, 1931.

Means of Freezing Fish Without Coming in Contact With Cooling Medium—Alexander H. Cooke to the Atlantic Coast Fisheries Co., New York City. No. 1,795,330. March 10, 1931.

Molds for Boiling Hams Cleaned by Revolving Brushes in Tank of Liquid Cleaning Agent—Charles S. Ott and Joseph R. Lewis, San Francisco, Calif. No. 1,795,671. March 10, 1931.

Attachment to Meat Cutting Machines for Mixing and Stuffing Sausage—Cecil C. Wilson, Lewiston, Pa. No. 1,796,677. March 17, 1931.

Electrically Driven Machine for Cleaning Meat Blocks—Samuel Ardron, Los Angeles, Calif. No. 1,796,700. March 17, 1931.

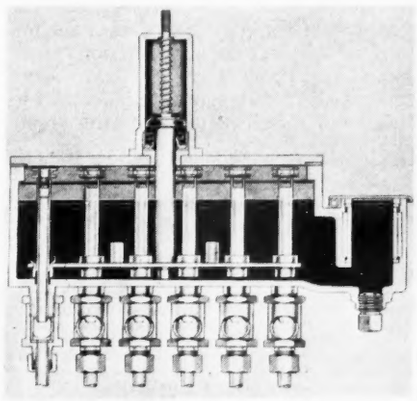
Suspension Racks for Dressing Poultry—Charles W. Williams, Arvada, Colo. No. 1,796,739. March 17, 1931.

Method of Packing Ground Meat in Tamale Form Package—George C. Gochnauer, Camp Hill, Pa. No. 1,797,137. March 17, 1931.

NEW EQUIPMENT FOR FOOD MANUFACTURERS

Automatic Multiple Oiler With Gravity Feed

SIMPLICITY of construction and non-clogging are the principal features claimed for the automatic multiple oiler announced by Gits Bros. Mfg. Co., 1848 South Kilbourn Ave., Chicago, Ill. Controlled quantities of oil varying from ¼ to 10 drops are delivered by gravity to each bearing regardless of the viscosity of the oil, as long as it will flow



through passages never less than ⅜ in. Each oiler is made in eleven sizes having from two to twelve leads, and is intended to be located within 3 ft. of the bearings being lubricated.

As many as a hundred oilers can be operated simultaneously from a single source and, where desirable, a different grade of oil may be used in any one of them to suit particular conditions.

Operation can be by air, solenoid electric motor, link connections to the machine being lubricated or by hand. Whether operation is accomplished by air piston, solenoid, or geared motor, a separate timing device is required for each type, except when the oiler is operated mechanically. These timing devices can be set to operate the oilers at intervals of 6, 12, and 24 min. or up to any interval that is necessary. In cases where three or four oilings a day are sufficient, hand operation is preferable. The timers can be driven by small electric motors or can be belted to the machine being lubricated.

The cross-section view shows a pneumatically operated oiler with six leads. Essentially it consists of a piston and plunger with a crossbar to which six oil cups are attached. Ordinarily these cups rest in the bottom of a clear well of oil, but at selected intervals the crosshead is raised by the air piston to a fixed height and a quantity of oil in each cup discharged through standpipes connected directly to sight feed glasses below where the connection is made by tubing to the various bearings. By means of adjustable sleeves with slotted ports surrounding these standpipes, the quantity of oil fed can be controlled within close limits. Adjustment of each individual sleeve is by a collar engaging a crankpin in the end of a solid stud. The timing device can be set so that the cups are held in the discharge position at an interval proportional to the viscosity of the oil, allowing complete drainage at the selected port level.

It is possible to operate the oiler by hand at any time or by a remote-control switch independent of the timer, to flush the bearings when starting up. All oiler units are equipped with a sight gage and filling cap to show the oil level in the reservoir. The body is aluminum and the fittings are brass. Copper tubing of ⅛ in. outside diameter, usually is furnished and is pushed into the bearing hole and held by a clamp.

Foil Mechanically Removed From Bottle Necks

UNTIL recently the cost of removing the foil from necks of used bottles was so near the cost of new bottles that little effort was made to reclaim beverage bottles. The accompanying illustration shows how the reclaimed bottle is processed by a foil-removing machine

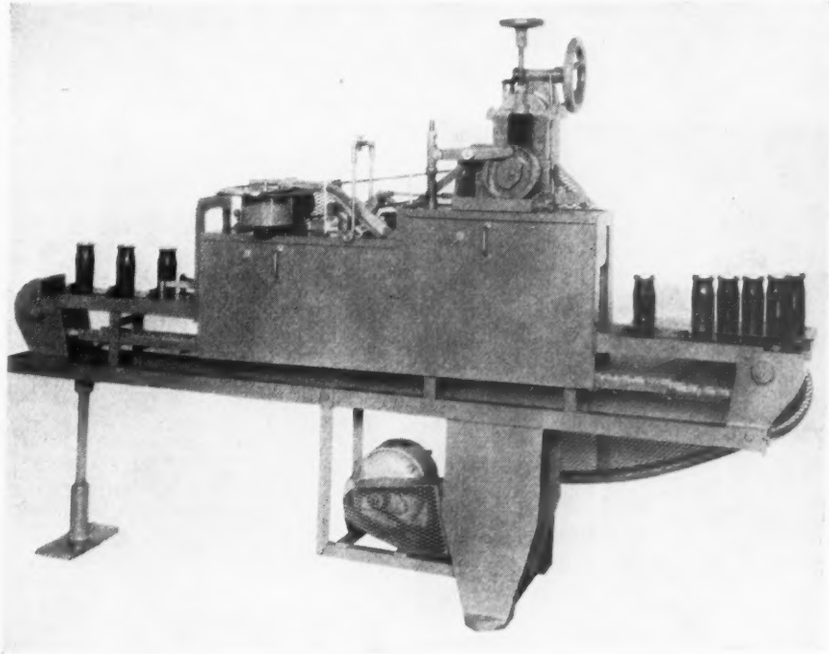
developed by the Edward Ermold Co., New York City.

The guide pin by which the bottle is held in position serves also as a stopper to prevent fragments of the foil wrapping from entering the bottle. Adjustable fingers made from wear-resisting spring steel remove the foil so completely, it is asserted, that when the bottle comes from the soaking, washing, and sterilizing machine reclaimed bottles cannot be told from new ones.

A ¼-hp. motor operates the revolving head, so that as the neck of the bottle is slowly guided into position between two sets of scraper fingers and withdrawn all portions of the foil-covered surface have come in contact with the scraping points. The scraper fingers are reversible and the working parts are lubricated by the Alemite system.

Sealing Machine Sterilizes As It Seals

THE vapor sealing machine developed by White Cap Co., 1369 North Branch St., Chicago, Ill., promotes glass packing of fruit products sealed under reduced pressure. Jars



containing hot fruit preserves and the like pass into a steam-heated chamber in which the head space of the jar is exhausted and sterilized by steam, the cap sterilized, and the jar sealed. As the contents of the jar cool the inclosed vapor condenses and produces a reduced pressure to give the jar a firmer seal. It is claimed that any desired vacuum in the jars can be obtained by this equipment if the jars are filled with hot contents.

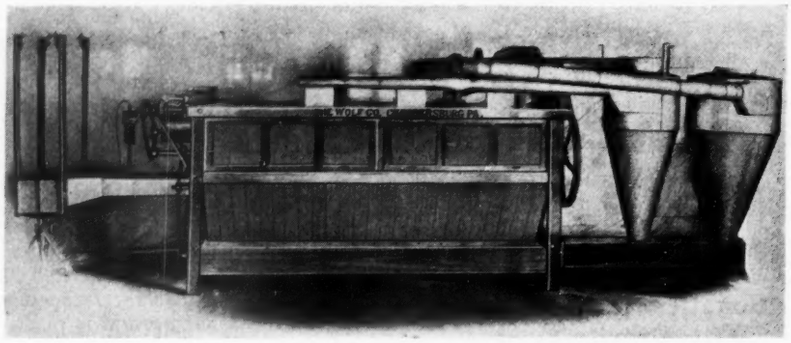
The machine is of the straight-line conveyor type, continuous in operation, gives speeds up to 100 units per minute and is adjustable for jars ranging in height to 12 in. and for caps from 38 mm. to 83 mm. diameter without changing parts.

Small-Batch Canning Aided By New Sealer

A CANNER interested in making an experimental or sample batch run usually is faced with the trouble and expense of preparing and operating his large-capacity sealing machines. Also he sometimes desires to furnish samples in cans differing considerably in size from those he packs commercially. In both instances he feels the need of a means for making the commercial type seal on the cans without disturbing the schedule for his standard sealing machines.

This need is said to be met by a compact hand-operated sealing machine developed by the Automatic Canning Devices, Inc., 549 West Randolph St., Chicago, Ill. The machine as shipped is adjustable to seal Nos. 1, 2, 2½, and 3 cans, and by change of parts can be used to seal cans of seven different diameters and varying in height from 2 to 4⅞ in.

The illustration shows a can lifted into position ready for sealing as the crank is turned. A ratio of gears, worm, and crank revolutions has been obtained which will turn the can thirteen times during a sealing operation. This insures a gradual action of the sealing rolls to give a uniform seam. All gears



are guarded and the work gear operates in a bath of oil in an oil-tight housing.

The machine may be used to open and reflange cans as well as seal them, if such operations are desired.

Mogul Starch Reconditioned In Reel-Type Machine

APPLYING flour-milling type of equipment to treatment of confectionery starch, the Wolf Co., Chambersburg, Pa., becomes manufacturers of starch cleaning units for candy manufacturers. It is asserted that this machine continuously and automatically removes the used starch from the molding machine, bolts it to remove particles of candy, brings it to desired temperature and moisture content, and returns it to the molding machine for reuse.

The installation includes an air temperature regulator, a special type of centrifugal reel, fans for forcing the treated air through the reel and for cleaning the reel cloth by suction, separators for collecting the air-borne starch, and conveyors incidental to transfer of starch before and after treatment.

MANUFACTURERS' PUBLICATIONS

Crushers, Dryers, Mixers, Cookers, and General Equipment—In an illustrated leaflet known as bulletin No. 31, Consolidated Products Co., Inc., 15 Park Row, New York City, lists and describes its composite line of second-hand and rebuilt machinery applicable to many uses in the food field.

Canning Equipment—In a series of leaflets illustrating and including detail specifications the Sprague-Sells Corp., 308 West Washington St., Chicago, Ill., describes some of the items of its complete line of canning equipment that were exhibited at the canning exposition.

Deep-Well Pumps — Axiflo, Hiflo, and Coniflo types of deep-well pumps manufactured by the Worthington Pump & Machinery Corp., 2 Park Ave., New York City, are illustrated in construction and application in a 32-page catalog known as D-450-B1A.

Ice Cream Accounting—The accounting bureau of the International Association of Ice Cream Manufacturers, Harrisburg, Pa., has prepared two booklets entitled "The Accounting Bureau" and "Uniform Method of Accounting" for distribution to manufacturers of ice cream.

Homogenization — In a leaflet from a loose-leaf catalog, E. Trudell & Co., 304 Youville Square, Montreal, Canada, illustrate their homogenizers and list applications.

Test Bottle Rack—In a descriptive and illustrated leaflet the King Co., Owatonna, Minn., describes its cream test bottle rack and accessory equipment.

Steam Purification—The Cochrane Bulletin, published by the Cochrane Corp., 17th St. and Allegheny Ave., Philadelphia, Pa., is devoted to the heating, de-aerating, softening, filtering, and metering of water, the measuring of steam and the profitable utilization of low-pressure steam.

Ornamental Confectionery — Berling's school on art and ornamentation in manufacture of confectionery, pastry, and candy, located at 1465 Third Ave., New York City, describes its courses in an illustrated leaflet.

Power-Driven Coffee Mills — Descriptive matter concerning coffee mills is included in a leaflet published by the Enterprise Mfg. Co. of Pennsylvania, Philadelphia, Pa.

Cake and Ice Cream Decoration—In an illustrafed leaflet Joe Lowe Corp., Bush Terminal Building No. 8, Brooklyn, N. Y., describes its Design-o-graph method of decorating cakes and ice cream bricks.

Milk Pasteurization and Storage Equipment—Catalog NH-1931, prepared by the Standard Milk Machinery Company, Louisville, Ky., contains 26 pages of photographic illustrations and descriptive information regarding Mortensen holders and other Mortensen pasteurization installations.

Cutting Costs in Coffee Roasting—An 8-page illustrated booklet published by Jabez Burns & Sons, Inc., 11th Ave. and 43d St., New York City, contains a reprint of an article entitled "Where to Cut Costs in Plant Operations."

Liquid Level Control—Device for automatically maintaining full flooded condition in all types of refrigerating evaporators is illustrated and described in a leaflet prepared by the Grinnell Company, Providence, R. I.

Homogenizer — Features of the York homogenizer are listed in illustrated bulletin No. 30162 prepared by the York Ice Machinery Corporation, York, Pa.

Nickel Alloy Steel Products—In a 16-page booklet, the International Nickel Company, 67 Wall St., New York City, lists the manufacturers, fabricators, and distributors of these products.

Industrial Lubrication — In an 8-page booklet entitled "Alemite Industrial Lubrication," published by the Alemite Corporation, North Crawford Avenue, Chicago, Ill., is an illustrated article on high-pressure lubrication systems.

Flavors and Perfumes — In a 20-page booklet, the Ungerer & Company, New York City, catalogs and prices its flavor and aromatic products.

Cycle Regulators—Bulletin No. 8000, published by the Taylor Instrument Company, Rochester, N. Y., contains complete description of the time-cycle regulator designed by the company to give automatic control over starting and stopping operations by means of electrical or fluid operated device.

Wrapping Machines—In a 63-page booklet prepared by the Package Machinery Company, Springfield, Mass., various types of wrapping machines are described and illustrated and many users of these machines in the various fields of food manufacture are listed.

Packaging Equipment—Several types of packaging machines manufactured by the Pneumatic Scale Corporation, Norfolk Downs, Quincy, Mass., are shown in an illustrated leaflet indicating the different kinds of packages handled by these machines.

NEWS OF THE MONTH

Canadian Tariff on Food Products Hits Large U. S. Export Market

By Paul Wooton
Washington Correspondent

CANADA'S new tariff imposes higher duties on food products imported from the United States that last year totaled $21,235,000. The items affected constitute approximately 38 per cent of all our exports of foodstuffs for consumption in the Dominion. Previously on the free list, oranges are the principal item affected by the new tariff from the standpoint of value. This fruit is now subject to a duty of 35c. per cubic foot (87c. per box). Canada's purchases of oranges represent practically all of the oranges exported from this country. Last year's total of $8,588,000 also constituted the major portion of Canadian imports. Small imports from the United Kingdom, Japan, and Spain brought the total up to $10,145,000. Shipments from the United Kingdom originated in British South Africa and Spain. The British product is still accorded free entry but the Japanese and Spanish oranges, in common with exports from the United States, must pay duty.

Corn imported for distillation remains dutiable at 7½c. Corn for manufacture into starch and other products remains on the free list, but corn used for livestock feed, which was duty free in the past, now must pay a duty of 25c. a bushel. The new duty on feed corn gives Argentina a differential of 5c. a bushel, as Argentina, being entitled to most-favored-nation treatment in Canada, pays the intermediate rate of 20c. a bushel. Argentine corn has been underselling United States corn in the Dominion market in recent years, with the result that imports from this country of corn for purposes other than distillation totaled only $4,098,000 last year, as compared with $8,264,000 in 1929. The decline from $12,954,000 to $8,394,000 in Canada's total imports of corn for purposes other than distillation may be attributed to the large surplus of other grains available for livestock feeding. In line with a reduction in total imports of corn for distillation from $8,264,000 in 1929 to $4,098,000 in 1930, imports from the United States dropped from $1,766,000 to $226,000.

Among the meat products affected by tariff increases are cured pork products, including bacon, ham, shoulders, and sides; pork barreled in brine and dry salted. The duty has been raised from 3½c. to 5c. per lb. on these items, of which the United States furnishes practically the whole imported supply, with a total in 1930 of $2,359,000, as compared with $2,551,000 in 1929.

The United States has practically no competition in the Canadian market for prunes, but the duty has been increased from ⅜c. to 1c. a pound. Imports from the United States last year totaled $963,266, against $1,366,000 in 1929. With a tariff preference in Canada, Australia's advantage in the Dominion raisin market will be advanced by the increase from 3 to 4c. per lb. in the duty on imports from the United States. Canada's total imports of raisins declined from $2,504,000 in 1929 to $2,274,000 last year. Shipments from the United States dropped from a value of $1,610,000 to $1,180,000.

American canned fruits are well established in the Dominion market, but must bear an increase in duty from 2¾c. to 5c. per lb. Canada has developed a canning industry but does not produce several fruits for which there is a market. Of the total imports valued at $2,954,000 in 1930, the United States supplied canned fruits valued at $1,738,000. Imports both in total and in the amount supplied by the United States were considerably smaller than in the preceding year.

Over twenty food items bear increased duties under the new tariff, but with the exception of the foregoing they are not important items in the export trade of the United States.

Accident Frequency Lowered In Food Industries

THE frequency of accidents in the food industries for 1930 was less than for any previous year, according to statistics recently published by the National Safety Council. For the food group there were 17.72 lost-time injuries for each million hours' work. This frequency rate is slightly lower than for industry as a whole, which had 18.47 lost-time accidents per million hours for the same period. The accident severity rate of 1.48 days lost per one thousand hours' work also made a better showing than that for industry as a whole, which was 1.97. The food group ranked fourteenth in a list of 28 major industries on the basis of its frequency rate, and it ranked eleventh in severity of its accidents.

Among 93 food establishments for which comparable statistics for the past three years are available, the frequency of lost-time injuries has been reduced 22 per cent. The severity of such accidents, however, has increased 20 per cent in this period. Industry as a whole has reduced accident frequency 28 per cent and severity 8 per cent.

As in past years, meat packing companies had, during 1930, a high frequency rate but a low severity rate. Among the 28 major industrial groups, meat packing ranked twenty-third in degree of accident frequency, but in only six industries was the severity rate lower. Reports received from 67 establishments showed an average frequency rate of 34.68 lost-time injuries for each million hours' work, and a severity rate of 0.99 day lost per thousand hours. Reports from eleven meat-packing establishments over the past three years show that frequency has been reduced 51 per cent and severity 41 per cent.

In both food and meat-packing groups, small establishments, with less than a thousand employees, showed the highest accident rate. Among plants engaged in the manufacture of bakery products, corn products, confectionery, dairy products, sugar, flour and cereals, canned foods and preserves, the lowest accident frequency rate was recorded by the baking companies, and the highest by milling establishments. Credit for the lowest severity rate, 0.56, also goes to baking companies. The corn products industry, with 4.31 days lost per one thousand hours' work, had the highest severity rate of plants in the food classification.

COMING EVENTS

JULY

14-15 — American Dairy Science Association, University of California Farm, Davis, Calif.

14-16—National Confectionery Salesmens' Association of America, Norton Palmer Hotel, Windsor, Ont., Canada.

14-17—International Dairy Congress, Copenhagen, Denmark.

28-29—National Syrup and Molasses Association, Hotel Traymore, Atlantic City, N. J.

AUGUST

3-6—National Association of Retail Meat Dealers, West Baden Springs Hotel, West Baden, Ind.

11-14—International Apple Association, West Baden Springs Hotel, West Baden, Ind.

27—American Cranberry Growers Association, Pemberton, N. J.

31—Sept. 4—American Chemical Society, Statler Hotel, Buffalo, N. Y.

Canners' Directors Meet in Washington, Ask Food Guaranty Revision

REALIZATION on the part of leaders in the canning industry that coordination of endeavor is particularly necessary in the face of present difficulties was shown in the attendance and interest at the National Canners' Association board of directors' meeting, held in Washington on May 28. More than 125 were present, the largest attendance on record.

Revision of the food guaranty as proposed by distributors' organizations to make the canner entirely responsible for any alleged violations of laws and standards was regarded with disfavor. It was felt that the canners, through the association, should be allowed some voice in framing the revision. The conference committee was given authority at the meeting to consult with the wholesalers not later than July 10.

A possibility that unjust cancellations of contracts by distributors may be taking place led the secretary, Frank E. Gorrell, to suggest that examining committees should be set up by distributors' organizations. These committees would inspect the books of distributors who cancelled sales contracts, to determine whether the distributor had substituted other purchases in place of those contracted for future delivery. It was pointed out that the National Canners' Association had taken action of that kind when abuse of *pro-rata* contracts by canners was reported some years ago. The conference committee was given power to act on this matter.

A report on progress of Mapes Law standards was made by Dr. Paul B. Dunbar and Dr. W. B. White, of the Food and Drug Administration. It is hoped by next winter to have tentative standards on corn, green beans and small fruits; data on spinach, sauerkraut, and beets also are being collected. The difficulty of establishing a single standard for widely different varieties of the same product was stressed. An amendment to the Mapes Law permitting elasticity of definition to cover such divergent classes might be valuable in this connection, it was suggested.

The grading and inspection service to be established after July 1 by the Bureau of Agricultural Economics was explained by Wells A. Sherman. This service will be carried out on a fee basis for those canners who desire it.

The plan of the Foodstuffs Division of the Department of Commerce to compile quarterly statistics on stocks of canned products (described elsewhere in this issue) was indorsed by the group. Progress in the move for simplification of containers also came up for discussion. The approval of about 1,000 companies has been secured. Change of No. 10 cans from 6⅞ x 6⅝ in. to 6⅞ x 7 in. has been the chief objection.

Implying that there is no single cause or single remedy for present business conditions, H. W. Phelps, president of the American Can Co., made a forceful plea for conservative, hard work as the only logical step at this time. Overpessimism has now replaced overoptimism, he contended, and present prices for canned foods are lower than the real conditions justify. Undercapitalization in the canning industry is one of the chief causes of the distress selling that has led to demoralization of prices.

Approval of the budget of the organization for 1931 was accompanied by a resolution establishing maximum dues of any company, including its subsidiaries, at $40,000. Date of the next annual convention in Chicago was set for Jan. 25, 1932.

Canners and distributors, represented by their conference committees, will meet July 7 in Milwaukee, Wis., to consider revision of the food guaranty. This has been actively pressed by jobbers and wholesalers who desire assurance that they will not become involved in the toils of the Mapes Act.

Distributors are demanding an unconditional guaranty from canners that the goods are not and shall not be adulterated or misbranded within the meaning of either federal or state laws; that the canners will defend their customers against actions brought by federal or state authorities, or consumers; and indemnify them against any judgment, expense, loss, or damage.

Canners are willing to stand back of their product, but are not likely to subscribe to any guaranty against goods becoming substandard due to causes occurring after the goods leave their control. As there is much disagreement on the nature and extent of deterioration following packing, considerable discussion of this point is in prospect at the July meeting.

United Coffee Drive Planned By Reorganized Group

AN EXPANDED program of activity, including a large institutional advertising campaign, to increase consumption of coffee is planned by the National Coffee Roasters' Association as a result of a realignment of interests and change in membership requirements. "The end to a long era of division and misunderstanding among various factors in the industry" is said to have been achieved by the move.

Formerly the organization restricted membership to coffee roasters who distributed their product through wholesalers. In the future, active membership will be open to all coffee roasters, including chain store and wagon route interests, and associate membership will be open to suppliers of green coffee and manufacturers of equipment and supplies.

Adequate financing has been assured for the organization campaign. Cooperation of practically all of the national coffee companies, as well as prominent coffee men in all sections of the country, has already been secured for the anticipated expansion of activities. A substantial increase in the consumption of coffee is expected to result from the united action, according to Lot Boardman, president of the association.

Multiple Seizure Ruling May Go to Supreme Court

THE government is expected to appeal to the U. S. Supreme Court from the recent decision of the Court of Appeals of the District of Columbia holding that under the Food and Drugs Act the Department of Agriculture has no authority to make multiple seizures of goods except when necessary to protect the public health.

Enforcement officials contend that the law does not permit of any qualification upon their authority to make multiple seizures. As they define the issue, it is simply whether they have or do not have such authority. They regard the District of Columbia court's decision as making a distinction, between seizures of products that may be dangerous to health and seizures of other products that may be merely misbranded, that does not exist in the law. Pointing out that the law does not state specifically whether seizures may be made singly or in multiple, the Food and Drug Administration officials state that this rests upon their discretion and that common sense dictates when multiple seizures should be made. The law enforcement officials explain that three seizures are regarded as necessary to obtain a real trial of the issue involved, because of the multipilcity of opportunities for beclouding the issue with technicalities.

On the other hand, many food and drug manufacturers, in common with the National Remedy Co., defendant in the present case, protest that if forced to defend themselves in libel proceedings in numerous federal courts, it would ruin their business. In the case at bar the company contends that the seizures made by the department in several jurisdictions threaten to deprive it of property through the destruction of its business, that such action was equivalent to a lack of judicial review and constituted an arbitrary exercise of power depriving the company of its property without due process of law. The Court of Appeals of the District of Columbia took this view in holding that multiple seizures were not contemplated by Congress, "except possibly in ususual cases where drastic action would be necessary for the protection of the public."

Raise Tariff on Dried Eggs And Packaged Olive Oil

ACTING on the recommendation of the Tariff Commission, President Hoover has proclaimed an increase from 18c. to 27c. per lb. on dried egg products, and a reduction from 9½c. to 8c. per lb. on packaged olive oil. The Commission also submitted a report on cheese, but recommended no change in duty.

The increase in duty on dried egg products embraces dried whole eggs, dried egg yolks, and dried egg albumen. The Commission reported that 80 per cent of domestic consumption of dried eggs is used where frozen or shell eggs cannot be used, but domestic products declared at the hearing before the Commission, in asking for an increase in duty, that domestic manufacture of dried eggs could be placed on a firm footing by converting milk-drying plants and utilizing modern dairy plants in which byproduct steam is available. The Commission reported that the present duty of 18c. falls short of equalizing the disparity between the domestic and Chinese cost of production by more than 50 per cent.

The Commission's investigation of olive oil included the bulk as well as the packaged product, but no change was recommended in the present duty of 6½c. per lb. on the former, because, according to the Commission, a comparison of foreign and domestic costs does not furnish a proper basis for adjusting the duty under the flexible tariff. The Commission explained that the greatest factor, about two-thirds, in the cost of domestic oil, is the price paid for the olives for crushing. As the olives crushed for oil are not the major product of the growers but a byproduct, the price received by them for olives for crushing does not depend on the average cost of production of all olives but entirely on what the crushers will pay, and this in turn depends upon the price which the crushers receive for oil. In view of the fact that about 98 per cent of the entire consumption of olive oil is supplied by imports, the price at which the domestic oil is sold depends on the price of imported oil, and that price is affected by the existing duty. Because of this chain of circumstances, the cost of olive oil produced in this country is itself substantially determined by the rate of duty on imported oil, and no comparison with foreign costs is possible. The Commission also decided that it was impracticable to ascertain the costs of growing domestic olives for oil, because such olives in the United States are a variable byproduct.

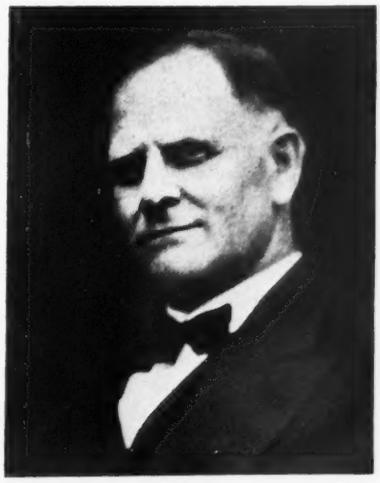
Reporting with reference to packaged olive oil, the Commission said that domestic costs exceed Italian costs of packing, including delivery to the principal competing markets, by 71c. per gal. This is equivalent to 8c. per lb. on the weight of the olive oil and container, as compared with the existing duty of 9½c. per lb.

The Commission's investigation of cheese arose from an application received from a French agricultural association with reference to Roquefort, and a Senate resolution. American and Swiss cheese were not covered by the inquiry. The Commission reported that imports of all types of cheese reached a peak in 1927 of over 80,000,000 lb., but have steadily declined since then to 69,000,000 lb. in 1930. Production in the United States of the principal foreign types of which there are imports amounted in 1929 to 17,405,000 lb. This production consists largely of Limburger, Camembert, and a scattered output of Italian and Greek varieties. Under the 1930 tariff, cheese is dutiable at 7c. per lb., but not less than 35 per cent ad valorem. This was an increase of 2c. per lb. over the 1922 tariff, subject to the same minimum, except on Swiss cheese, on which the rate had been increased by presidential proclamation to 7½c., but not less than 35 per cent.

Huge Tomato Cannery For U.S.S.R.

THE largest tomato-paste plant in the world, a unit in the Soviet five-year plan, is expected to be in operation shortly after Aug. 1. It will have a capacity of 40 tons an hour. Tomatoes growing on 30,000 acres in the foothills of the Caucacus Mountains will go to the plant, which is being erected at Krimskaya, 60 kilometers from the seaport town of Novorossiisk, on the Black Sea.

Equipment including fifteen open glass-lined kettles, each of 1,000-gal. capacity, three large precooling tanks, and six vacuum cookers of 9,000 lb. per hour capacity, as well as nearly 1,000 ft. of glass-lined pipe and fittings, are now en route to the U.S.S.R. from the Pfaudler Co. U. G. Todd, of that organization, will have charge of the erection of the equipment and will supervise operation of the plant on this season's pack. American contracts for canning and power-plant equipment for this plant totaled over $250,000.



U. G. TODD

Who will supervise erection and operation of huge tomato-paste plant

Food Definitions Adopted by Agriculture Department

NEW definitions for dextrose, tomato juice, and whole wheat bread, and revised definitions for white bread, raisin bread, Boston brown bread, and sorghum syrup have been adopted by the Secretary of Agriculture, it was announced on June 20. The definitions will be used as a guide in enforcing provisions of the Food and Drugs Act. These definitions and standards were recommended by the Food Standards Committee, which is composed of representatives of the Association of Dairy, Food and Drug Officials of the United States, of the Association of Official Agricultural Chemists, and of the U. S. Department of Agriculture. The official text of the definitions follows:

DEXTROSE is the product chiefly made by the hydrolysis of starch or a starch-containing substance, followed by processes of refining and crystallization.*

Anhydrous dextrose contains not less than 99.5 per cent of dextrose and not more than 0.5 per cent of moisture.

Hydrated dextrose contains not less than 90 per cent of dextrose and not more than 10 per cent of moisture, including water of crystallization.

CANNED TOMATO JUICE is the unconcentrated, pasteurized product, consisting of the liquid, with a substantial portion of the pulp, expressed from ripe tomatoes, with or without the application of heat; and with or without the addition of salt.

WHOLE WHEAT BREAD, ENTIRE WHEAT BREAD, GRAHAM BREAD, is the product, in the form of loaves or smaller units, obtained by baking a leavened and kneaded mixture of whole wheat flour, water, salt, and yeast, with or without edible fat or oil, milk or a milk product, sugar and/or other fermentable carbohydrate substance. It may also contain diastatic and/or proteolytic ferments, and such minute amounts of unobjectionable salts as serve solely as yeast nutrients.† It contains, one hour or more after baking, not more than 38 per cent of moisture.

WHITE BREAD is the product, in the form of loaves or smaller units, obtained by baking a leavened and kneaded mixture of flour, water, salt, and yeast, with or without edible fat or oil, milk or a milk product, sugar and/or other fermentable carbohydrate substance. It may also contain diastatic and/or proteolytic ferments and such minute amounts of unobjectionable salts as serve solely as yeast nutrients.† The flour ingredient may include not more than 3 per cent of other edible farinaceous substance. White bread contains, one hour or more after baking, not more than 38 per cent of moisture. The name "bread" unqualified is commonly understood to mean white bread.

RAISIN BREAD is the product, in the form of loaves or smaller units, obtained by baking a leavened and kneaded mixture of flour, water, salt, yeast, and raisins, with or without edible fat or oil, milk or a milk product, sugar and/or other fermentable carbohydrate substance. It may contain diastatic and/or proteolytic ferments, and such minute amounts of unobjectionable salts as serve solely as yeast nutrients.† The flour ingredient may include not more than 3 per cent of other edible farinaceous substance. The finished product contains not less than 3 oz. of raisins to the pound.

BOSTON BROWN BREAD is the product, commonly in the form of cylindrical loaves, obtained by steaming or baking a leavened mixture of rye flour or meal, corn meal, a wheat flour, molasses, salt, water, and/or a milk product, with or without raisins. Leavening is commonly effected through the use of baking powder or sodium bicarbonate and sour milk.

SORGHUM SYRUP is the syrup obtained by the clarification and concentration of the juice of the sugar sorghum and contains not more than 30 per cent of water, nor more than 6.25 per cent of ash calculated on a dry basis.

*When derived from cornstarch, dextrose is known commercially as refined corn sugar.

†The propriety of the use of minute quantities of oxidizing agents as enzyme activators is reserved for future consideration and without prejudice.

Confectioners Convene at Chicago; Take No Action on Candy Institute

WITH a lower total registration than usual, the National Confectioners' Association met in its 48th annual convention at Chicago, Ill., June 2 to 5. The lower attendance and shorter convention period encouraged greater individual interest in exposition exhibits which were on display for the usual five-day period.

In the absence of an expressed plan for the formation of a candy institute, no convention action was taken on this project. Unsettled economic conditions of the past year prevented the candy institute committee from making such progress as could be presented to the convention in the form of an accomplishment report. As an elaboration upon the subject, "Confectionery Problems," discussed before the convention last year, the illustrated talk on "Water —Its Importance as a Raw Material," by Stroud Jordan, Director of Applied Sugar Laboratories, New York City, threw emphasis upon the need for organized research by manufacturing confectioners. Analysis of water from 101 cities in the United States showed that 51 per cent had water with a lime content of less than 150 p.p.m., which is satisfactory for sugar boiling; that 21 per cent had water moderately hard which might be used; that 6 per cent had hard water; and that 22 per cent had water that could not be used for sugar boiling without being treated. A series of tests with twelve different waters, each containing colors commonly used in confectionery making, demonstrated the effect of the dissolved solids on the colors before and after boiling. Also, hard-candy samples were shown to indicate the effect of these solids upon the clearness of hard candy made with different types of water.

For the first time, the National Confectioners' Association convention was addressed by representatives of allied trades upon subjects of practical interest to candy manufacturers. One of the four convention days was given over to such subjects as: "The Rôle of Dextrose in Candy Manufacturing," by John M. Krno, Corn Products Refining Co., New York City; "Contributions of Gelatine Research to the Confectionery Industry," by W. W. Duecker, Mellon Institute of Industrial Research, Pittsburgh, Pa. Distribution cost studies were reported by R. L. Purdon, U. S. Department of Commerce.

The 1932 convention is scheduled for Atlantic City, N. J., with the 1933 World's Fair Session returning to Chicago. Officers elected for the coming year are as follows: president, Arno E. Sander, president, York Caramel Co., York, Pa.; first vice-president, Leon Sweet, Sweet Candy Co., Salt Lake City, Utah; second vice-president, Walter Hardie, Hardie Brothers Co., Pittsburgh, Pa.; secretary-treasurer, Walter C. Hughes, 111 West Washington St., Chicago, Illinois.

ARNO E. SANDER
New president of the N.C.A.

Plastic May Provide New Use for Sugar

AN industrial use of sugar that may have widespread commercial possibilities is seen in a new plastic, known as "Sakaloid," that has recently been developed. In a search for a more satisfactory electrical insulating material, Arthur S. Ford, a British engineer now residing in the United States, has produced a material the chief constituent of which is polymerized sugar.

Depending upon the manufacturing process, the product can be made as soft and elastic as rubber or as hard as glass. It can be molded by casting in open forms or can be reduced to shreds and then molded under pressure. It is said to be easily machined and of high dielectric properties. In its pure form, it is transparent, and is also declared to be permeable through the ultra-violet range. It chars at high temperatures, but is non-inflammable.

In general, the manufacturing process involves the use of any commercial sugar, molasses, or glucose, which is boiled to a thick syrup and then treated with an aldehyde or similar polymerizing agent, with or without a catalyst, depending upon the properties desired.

Macaroni Makers Support Promotional Campaign

EFFORTS for close cooperation on the part of macaroni manufacturers are indicated in continued approval for the four-year promotional campaign involving the expenditure of $1,000,000 for institutional advertising. At the convention of the National Macaroni Manufacturers' Association held in Chicago, June 16-18, it was decided to spend $250,000 in newspaper advertising during the coming year to make American housewives more "macaroni conscious." R. B. Brown, head of the promotional committee, was reelected to that office.

Another move for better trade relations within the industry is seen in the attention given to a uniform system of cost accounting developed for members of the organization. G. G. Hoskins, in charge of this work, pointed out that the system is now being used by twelve macaroni companies with very successful results. It is felt that the accurate knowledge of costs revealed by such a standard method of accounting would do much to prevent uneconomic competition in which ignorance of real costs leads to sales below the cost of production. The value of scientific methods of property accounting and plant appraisals also was considered at the meeting. F. W. Jackson, of the American Appraisals Company, spoke on this subject.

Government action for the standardization of macaroni products and the establishment of definitions were supported at the meeting. A special committee was appointed to cooperate with the authorities in this matter. Frank Zerega, of A. Zerega's Sons, Inc., Brooklyn, N. Y., was reelected president of the association.

Membership Change Made in Biscuit and Cracker Groups

A CHANGE in the membership relation of the Biscuit and Cracker Manufacturers' Association to its affiliate, the Biscuit and Cracker Manufacturers' Co., was one of the important developments of the convention of the two organizations held in Chicago, May 26 to 28. Because of developments within its own organization, the United Biscuit Co. announced its withdrawal from the Manufacturers' Co., which conducts group purchasing and technical training for its members. United Biscuit, however, will remain a member of the Association. It is felt that expansion of the Association to include other large manufacturers who may not desire the services of the affiliate could well be carried out by a similar plan.

The technical institute of the group will be taken over by the Company without change in policy under the new arrangement, a resolution passed at the convention provided. A change in name of the Company to indicate that the purchasing and technical service will function primarily in the independent field is under consideration.

President W. C. Scott and Vice-President John Hekman will continue at the head of the Association. R. T. Stokes will serve as secretary-treasurer. E. K. Quigg and W. H. Adams have been elected president and vice-president, respectively, of the Manufacturers' Co., and H. D. Butler will be secretary and purchasing agent. A. A. Schaal has resigned as director of the technical institute, and will join the Quality Biscuit Co., of Milwaukee, Wis.

World Dairy Conditions Discussed in Report

CURRENT developments in the world dairy situation are a marked increase in butter production in Canada, virtual cessation of Canadian exports of cream and milk to the United States, and the higher Canadian tariff on butter, according to the Bureau of Agricultural Economics, U. S. Department of Agriculture, in its June report on world dairy prospects.

Other features, says the bureau, include some increase in exports of condensed milk from the Netherlands to countries that might afford an outlet for American exporters, and unusually long-continued supplies of butter from Southern Hemisphere sources. Importations of dairy products into the United States have declined materially during 1931 to date, on account of increased tariffs and because of greater declines in domestic than in foreign prices of dairy products. Cream and milk imports have practically ceased.

The bureau reports that butter consumption has been greatly stimulated in Great Britain, and that European consumers appear to be turning to some extent from margarine to butter. Stocks of cheese held at English wharves and docks are said to be unusually large. World supplies of dairy products in 1931 as reflected in volume of international trade do not appear to have been enough heavier than in the preceding year to account for the general price declines, says the bureau.

Surveys of Canned Food Stocks And Beverage Sales Begun

A QUARTERLY survey of canned food stocks of canners, wholesalers, and chain-store systems is now being undertaken by the U. S. Department of Commerce, at the request of producers and distributors of various canned food products. Statistics compiled from this survey are expected to be useful in eliminating intermittent periods of over- and under-production, which comprise one of the industry's most important problems. By ascertaining the stocks of canned foods on hand at successive intervals, trends of distribution can be determined.

In making its studies the Foodstuffs Division of the Commerce Department will have the cooperation of the National Canners' Association, the National Wholesale Grocers' Association, the American Wholesale Grocers' Association, and the National Chain Store Association. It is expected that other business organizations not members of these associations will also cooperate in the project.

The survey will be limited to those canners and distributors who agree in advance to make reports four times a year, and the success of the survey will depend upon the willingness of these groups to send in accurate reports promptly. Products to be covered will be canned corn, peas, tomatoes, wax and green beans, peaches, pears, pineapple, and salmon, as agreed upon by representatives of the canners and distributors at the conference on May 20.

The first summary of the reports will be released about July 20. It will show the total number of cases of each product held both by the canners and the distributors included in the survey.

The Foodstuffs Division last month also began to compile statistics on sales of the beverage industry, made at the request of the American Bottlers of Carbonated Beverages, who are cooperating closely in this work. The cooperating group will send in reports of total sales and sales by type of flavor and size of bottle. These figures will be published monthly by the Department of Commerce. The schedule includes ginger ale, the cola beverages, orange, grape, lemon, strawberry, chocolate, root beer, cream soda, and cereal beverages.

Production Activity Rises in Food Field

Despite further decline in both wholesale and retail prices and a lower index of general business conditions, as reported by *The Business Week*, the confectionery, ice cream, baking, slaughtering, and meat-packing industries show an increase in number of employees and payroll totals for the month ending May 15.

Food manufacturers in general averaged an increase of 1.19 per cent in employee personnel and 1.6 per cent in payroll total for the month. All manufacturing industries averaged a decrease of 0.53 per cent in personnel and 1.18 per cent in payroll total for the same period.

Wholesale prices of all commodities declined 2.73 per cent, whereas wholesale food prices shrank 3.57 per cent between April 15 and May 15. In 51 cities food retail prices had an average fall of 2½ per cent, making a total drop of 19⅓ per cent for the 12-month period ending May 15, 1931.

Evidently the continued decrease in prices has led to a greater demand for manufactured food products. A retailing organization with national distribution reports an increase of 15.24 per cent in sales tonnage during May, 1931, over May, 1930.

During the past month *The Business Week* index has fallen from 77.6 per cent of normal to a new low of 75.8 per cent. This index of 75.8 per cent of normal represents general business conditions up to the approximate beginning of the stock market activity which developed last week.

Candy Sales Lower in 1930, Survey Shows

CANDY SALES dropped 1.8 per cent in volume and 7.7 per cent in value in 1930, as compared with 1929, according to the annual survey made by the Foodstuffs Division of the Department of Commerce, in cooperation with the National Confectioners' Association. The average price per pound received by manufacturers declined to 20.6c. from 21.9c. Per capita consumption dropped from 12.95 to 12.59 lb. On the manufacturers' price basis, the per capita expenditure averaged $2.59, and on a retail basis is estimated by the trade at 175 per cent of the manufacturers' figure, or about $4.50. Returns from 517 manufacturers, representing 86.4 per cent of national production, show total sales of 1,335,617,903 lb. for $275,317,458.

More than two-thirds of 1930 production was concentrated in Central and Eastern states. Manufacturers in Central states reported 39.2 per cent of the national poundage; in Eastern states, 32.8 per cent. Due probably to the warmer climate, per capita consumption in the Southeast and Southern states was lower than the national per capita. Data on the interstate movement of confectionery indicate inception of a tendency toward concentration of sales in the state of manufacture.

The proportion of sales to jobbers and chain stores increased and sales to independent retailers declined. Jobbers handled 56.3 per cent of total sales, as compared to 53.1 per cent in 1929; chain stores, 16 per cent, as compared to 13.3 per cent, and independent retailers, 20.5 per cent, as compared with 27.4 per cent. Sales direct to consumer through the manufacturers' own stores increased from 6 to 7 per cent, and mail order business remained at 0.2 per cent.

The poundage of molded chocolate bars and chocolate-covered bars increased in 1930, but a decrease in the average price per pound reduced the value in these two classes slightly. On a value basis, 24.2 per cent of total sales of confectionery was made up of chocolate-covered bars, and 10.9 per cent of total sales was chocolate bars.

In marked contrast to the general trend of sales, the 5c. and 10c. handy package candies increased in sales value. Twenty-three more firms sold this type of confectionery in 1930 than in the preceding year. Sales mounted to a total of 52,804,311 lb. valued at $12,136,723, as compared to 48,612,236 lb. valued at $11,136,935 in 1929. This type of goods accounted for 4.4 per cent of total candy sales in 1930, against 3.7 per cent in 1929, on a value basis.

Sales of penny goods on the other hand, declined from 209,376,292 lb. valued at $31,434,328 to 196,862,440 lb. valued at $29,196,187, although there was an increase from 10.5 to 10.7 per cent in the proportion to total sales of confectionery represented by this class of goods. Eleven additional firms were attracted to the sale of this type of product last year.

TRADE NOTES

BORDEN Co., New York City, plans the acquisition of CARPENTER DAIRY PRODUCTS Co., White Plains, N. Y. Listing of 3,200 additional shares of stock to cover the purchase has been approved.

CAMPBELL SOUP Co., Camden, N. J., is planning a large pack of tomato juice during the coming season. It will be advertised and marketed nationally. Processing which preserves flavor, color, and vitamin content to an unusual degree has been developed for the product, it is declared.

GENERAL FOODS, LTD., Canadian affiliate of General Foods Corp., has organized a new subsidiary, MINUTE TAPIOCA Co., LTD., with headquarters in Montreal. The new unit will take care of tapioca requirements for the Dominion. It will not affect production or employment at the Orange (Mass.) plant, it is announced. A "Swans Down" cake flour plant at Windsor, Ontario, to take care of requirements for the Dominion, was also recently opened. The plant will use flour made from Ontario wheat. This Canadian operation, says the announcement, will have no effect on employment conditions at the Iglehart Brothers, Inc., mills at Evansville and Vincennes, Ind.

HILLS BROTHERS Co., New York City, plans to add a new pimento and tomato sauce to its line of food products in the near future. The product, which is similar to catsup in color and consistency, is composed of 60 per cent pimentos and 40 per cent tomatoes.

NEW ENGLAND DAIRIES, INC., a "co-operative for milk cooperatives," has been organized at Montpelier, Vt. Objectives are to stimulate adjustment of production to consumption, to bargain on behalf of producers with distributors, and to aid in routing milk supplies to avoid shortages and surpluses throughout the New England area.

PACIFIC FROSTED FOODS, INC., San Francisco, Calif., recently formed joint subsidiary of Standard Oil Co. of California and General Foods Corp., has contracted with Ray Maling Co., Hillsboro, Ore., for 91 tons of strawberries, 150 tons of raspberries, and various vegetables to be sold in quick-frozen form.

PENNSYLVANIA SUGAR Co., Philadelphia, Pa., has purchased the assets and trademark of FINE ART FOODS, INC., manufacturer of soluble coffee and tea. The Fine Art plant is located at Tuckahoe, N. Y.

PERFECTION CANNING Co., Newark, N. Y., is planning a program of expansion that will more than double the capacity of its fruit and vegetable canning plants in western New York.

SHEFFIELD FARMS Co., New York City, has acquired the Miller Dairy Co., New Canaan, Conn., which serves 36 communities in Connecticut and 5 in New York. F. C. Miller, former president of the Miller Dairy, will continue as superintendent of the New Canaan plant.

SOUTHERN SUGAR Co. will undergo a financial reorganization which calls for transfer of all assets of Southern Sugar Co. and the Clewiston Co. to a new corporation, the UNITED STATES SUGAR CORP., if a plan now being considered is approved by stockholders.

SWIFT & Co., Chicago, Ill., have begun the manufacture of ice cream in a number of cities in the Middle West.

PERSONALS

NEIL R. BAKER, manager of the Columbus (Ohio) branch of the Fairmont Creamery Co., has been elected president of the Manufacturers & Wholesalers' Association of the Chamber of Commerce of that city.

HENRY L. BATTERMAN has been elected president of Adolf Gobel, Inc., New York City meat packing firm, to succeed FRANK M. FIROR, who has resigned. MALCOLM D. B. HUNTER has been elected a vice-president.

FREDERICK M. FEIKER, formerly with the McGraw-Hill Publishing Co., has been appointed director of the Bureau of Foreign and Domestic Commerce by President Hoover. For the past several years he has acted as consultant for the Department of Commerce on problems of organization and personnel, and has been managing director of the Associated Business Papers.

A. K. FISHER, Chicago, Ill., was elected president of the American Institute of Margarine Manufacturers at the annual meeting in Atlantic City on June 4.

W. R. GROVE, president of T. M. Sinclair & Co., Ltd., Wilson & Co. subsidiary at Cedar Rapids, Iowa, has been made vice-president of Wilson & Co., in charge of its Chicago plant. H. L. SKELLINGER has been made general manager of the New York City territory of the same organization.

THEODORE D. HAMMATT, formerly in charge of the grain and flour section of the Bureau of Foreign and Domestic Commerce, has been appointed senior marketing specialist of the Grain Futures Administration, U. S. Department of Agriculture. Mr. Hammatt also has served on the Kansas State Board of Agriculture, and at one time was president of the Crosby Roller Milling Co., Topeka, Kan.

D. W. KING has been made superintendent of the Chicago plant of Armour & Co., succeeding EDWARD INNES, who was appointed general superintendent and technical advisor for the U.S.S.R. meat packing industry by the Soviet Government a few months ago.

W. D. LIPPITT, for eleven years vice-president and general manager of the Great Western Sugar Co., Denver, Colo., has been elected president to succeed W. L. PETRIKIN, who becomes chairman of the board. Mr. Lippitt will continue to act as general manager.

T. H. LOWERY has succeeded GEORGE E. DRAKE as manager of the Stone Baking Co., Atlanta, Ga.

GEORGE M. MOFFETT has been elected president of the Corn Products Refining Co. to succeed E. T. BEDFORD. Mr. Moffett has been a vice-president since 1916, and management of the organization has been largely in his hands for the past two years. For a considerable period, he was general manager in charge of operations in the Middle West.

JOHN B. NEWMAN, a former commissioner of the Illinois State Food Department, has joined the Corn Products Refining Co. He will be connected with the department of that organization dealing with food laws. While connected with the State of Illinois, Mr. Newman served as secretary of the Association of Federal and State Food Officials. Later he was field secretary of the National Wholesale Grocers' Association.

DAVID J. PRICE

DAVID J. PRICE, of the Bureau of Chemistry and Soils, U. S. Department of Agriculture, received a Doctor of Philosophy degree from American University, Washington, D. C., on June 1 in recognition of his work on causes and control of dust explosions.

FRANK L. PARSLOE, controller and general manager of H. C. Bohack, Inc., Brooklyn, N. Y., who was responsible for development of packaged meats by that organization, recently resigned. He is now on a four months' trip to food plants in various parts of the country.

LAWRENCE G. PRESTON has been elected vice-president in charge of sales of the American Maize Products Co. He succeeds G. C. LINKER, who has resigned because of ill health. Mr.

Preston has for the past four years been in charge of sales of the Snider Packing Corp., Rochester, N. Y. Previous to that time he was connected with Penick & Ford, and with the Corn Products Refining Co.

ROBERT R. RUST has resigned as president of the DryIce Corp. of America. AUGUST HECKSCHER, chairman of the board, has assumed executive management.

P. J. SWEARINGTON, for 23 years associated with Bishop & Co., Los Angeles manufacturer of crackers, chocolate, and candy, has been elected president of the concern. He succeeds W. T. BISHOP, who retired as president several months after the company became a part of the National Biscuit Co. Mr. Swearington was general sales manager at the time of his election as president.

J. E. WILSON has been elected president of Batchelder, Snyder, Dorr & Doe Co., Boston, Mass., subsidiary of General Foods Corp. He succeeds FREDERICK S. SNYDER, who resigned a few months ago. Mr. Wilson has been with Batchelder & Snyder for the past eight years, and previously was general superintendent for Armour & Co. in the New England territory.

OBITUARY

JAMES P. CASEY, president of the Drovers' Packing Co., Chicago, Ill., died on June 1 following a short illness.

DATUS CLARK, president of the New York State Council of Agriculture and Markets, died on June 8 at Plattsburg, N. Y. He was 69 years of age.

ROBERT E. CONWAY, for many years an official of Armour & Co., died June 15 at his home in St. Louis, Mo., after an illness of several months, aged 65. He had held the post of superintendent of the Chicago, East St. Louis, Ill., and Florida offices, retiring four years ago on a pension.

DICRAN L. DADIRRIAN, president of Dr. Dadirrian & Sons Co., New York City, manufacturers of a cultured milk, died on June 14. Mr. Dadirrian was born in Turkey 59 years ago.

FREDERICK EMME, connected with Henry Heide, Inc., for 36 years, died at his home in Newark, N. J., a few weeks ago.

GLENN O. GARBER, president of the Garber Baking Co., Frederick, Md., died on May 17 following a heart attack. He was a past president of the Potomac States Bakers' Association and a member of the board of governors of the American Bakers' Association.

THOMAS P. HINCHMAN, formerly president of the Coffee Roasters' Association and prominent in the coffee industry in Chicago, Ill., for many years, died at Los Angeles, Calif., a few weeks ago.

LAZARUS B. LEVIN, associated with the United Packing Co., St. Paul, Minn., died on June 6 at the age of 58. He was formerly president of the Dakota Packing Co.

GEORGE D. MCLAUGHLIN, of W. F. McLaughlin & Co., Chicago, coffee and tea merchants, was killed June 8 in an automobile collision near his home at Lake Forest, Ill. He was 68 years old and, with his brother Maj. Frederic McLaughlin, had been in charge of the business since 1905.

HERMAN B. MEYERS, at one time publisher of the *American Food Journal*, died in Chicago, Ill., on June 3 at the age of 65.

JOHN W. REISE, manager of the Syracuse (N. Y.) division of Wilson & Co., died on June 2. He had been connected with the meat packing industry for more than 25 years.

MAX L. ROSENBURG, president of Rosenburg Bros. & Co., Pacific Coast dried-fruit firm, died in San Francisco, Calif., on May 18. He was 60 years of age.

LUCIUS C. WELDEN, manager in the metropolitan district for the John Cain Mayonnaise Products Co., Cambridge, Mass., died at Elizabeth, N. J., on June 15.

NEW CONSTRUCTION

Abattoir Building—English Co-Operative Society, Leeds, England, plans the construction of an abattoir building at Brandon, Man. Estimated cost $100,000.

Bakery—J. Boruta, 103 Halstead St., Wallington, N. J., is having revised plans prepared for the construction of 2 story, 75 x 75 ft. bakery, stores, etc., at Mercer St. and Wallington Ave. $40,000. J. T. Camlet, 26 Piaget Ave., Clifton, is architect.

Bakery—Continental Baking Co., Inc., 14th St., Hoboken, N. J., postponed alterations to bakery plant at Park Ave. and 14th St. $40,000. Maturity indefinite.

Bakery — Eight Hundred Forty Barry St. Corp., 704 East 133rd St., New York, N. Y., will build a 2 story bakery at Barry St. and Burnett Pl. P. J. Murray, 14 West 45th St., New York, is architect. Work will be done by separate contracts and day labor.

Bakery — Grant Baking Co., c/o J. Grant, Tulsa, Okla., awarded contract for the construction of a bakery at Amarillo, Tex., to C. J. Patterson Corp., 4050 Penn St., Kansas City, Mo. Estimated cost $125,000.

Bakery—Kern's Bakery, 1 Market Sq., Knoxville, Tenn., has work under way on the construction of a bakery on Maryville pike. Estimated cost $200,000. Contract let to S. D. Cox, Knoxville. Brown, Greer & Co., Inc., 415 Union Ave., Knoxville, operating plant.

Bakery — Puritan Baking Co., E. Brancoti, Prop., 286 Terrill Rd., Plainfield, N. J., postponed construction of a 1 story bakery. $40,000. C. C. Bell, 17 North Ave. E., Cranford, Archt. Maturity indefinite.

Bakery — F. Schreiber, c/o G. W. Backoff, 1023 Broad St., Newark, N. J., postponed building addition and alterations to bakery at 872 Newark Ave., Jersey City. $40,000. Maturity indefinite.

Bakery, Warehouse, Etc. — Constructing Quartermaster, Washington, D. C., received low bids for the construction of a bakery, warehouse, etc. for Army Medical Center, Walter Reed Hospital.

Bottling Plant—Coca Cola Bottling Co., 560 Edgewood Ave. N. E., Atlanta, Ga., awarded contract for a 2 story, 71 x 130 ft. bottling plant at Beaumont to Christy-Dolph & Collins, 902 Goodhue Bldg., Beaumont. $73,000.

Canning Plant—W. A. Best, Ltd., Wellington, Ont., will soon award contract for the construction of a canning plant. Estimated cost $100,000.

Canning Plant—Connecticut State Farm for Women, c/o Comptroller, State House, Hartford, will soon award contract for a service building, canning plant, storage building, etc., at Niantic. Estimated cost $150,000. Golden Storrs & Co., 11 Asylum St., Hartford, are architects.

Canning Plant (Fruit)—Perfection Canning Co., Newark, N. Y., plans expansion to fruit canning plant to double capacity. Estimated cost $200,000.

Canning Plant (Tomato) — J. A. Killian, North Church St., Nacogdoches, Tex., awarded contract for a 1 story, 40 x 100 ft. tomato canning plant, including boiler room, loading racks, complete equipment, etc., to L. Rulfe, Nacogdoches. $60,000.

Cranberry Sauce Plant—Ocean Spray Cranberry Sauce Co., Main St., Hanson, Mass., will build a 1 story plant. Estimated cost $25,000. Private plans. Work will be done by owner's forces.

Packing and Freezing Plant—Texas Frozen Juice Corp., Harlingen, Tex., now organizing, plans the construction of a plant to freeze citrus fruit, capacity 300 cars of fruit a season. Estimated cost $65,000.

Confectionery Factory — F. L. Daggett, 408 Main St., Cambridge, Mass., awarded contract for addition and alterations to confectionery factory at 18 Ames St. to W. M. Bailey & Co., 88 Broad St., Boston. Estimated cost $40,000.

Mineral Spirits Plant — American Mineral Spirits Co., 205 East 42nd St., New York, N. Y., is receiving bids for the construction of a plant at Carteret N. J. Estimated cost $40,000. Private plans.

Syrup Plant—C. M. Haskell, Oklahoma City, Okla., is having preliminary plans prepared for the construction of a 2 story factory for producing carrot syrup at Brownsville, Tex.

Food Products Plant—Christy, Brown Biscuit Co. Ltd., Halifax, Nova Scotia, is having plans prepared for a 1 story plant. Estimated cost $40,000. E. J. MacDonald, 250 Stuart St., Boston, Mass., is engineer.

Food Packing Plant and Bakery—L. L. Le Veque Co., 1314 Edgehill Rd., Columbus, O., will build a 4 story, 80 x 120 ft. food packing plant and bakery at Mertle and Hamburg Sts., Buffalo, N. Y. Great Atlantic & Pacific Tea Co., 420 Lexington Ave., New York, N. Y., is lessee.

Grocery Distribution Warehouse — Loblaw Groceterias Inc., 168 Chandler St., Buffalo, N. Y., awarded contract for a 4 story, 225 x 300 ft. distribution warehouse at Bailey Ave. and Clinton St. to J. W. Cowper Co., Niagara Sq., Buffalo. Estimated cost $500,000.

Produce Plant — Fisher Bros. Co., E. H. Fisher, Secy., 2323 Lakeside Ave., Cleveland, O. (wholesale and retail grocers), had plans prepared for a 1 story, 40 x 220 ft. plant at East 40th and Orange Sts. Estimated cost $150,000. G. S. Rider Co., Marshall Bldg., Cleveland, is architect and engineer.

Produce Warehouse—Great Atlantic & Pacific Tea Co., Sherman Ave., Newark, N. J., awarded contract for a 1 and 2 story 125 x 285 ft. addition to production warehouse at Railroad and 5th Aves., Paterson, to Austin Co., 120 Broadway, New York, N. Y. Estimated cost $150,000. Bids will be taken later on boiler, stack, refrigeration machine, etc.

Creamery and Produce Plant — Chamberlain Produce & Creamery Co., Chamberlain, S. D., is having plans prepared for the construction of a creamery and produce plant. Estimated cost $35,000.

Dairy Plant — Beatrice Creamery Co., 1526 South State St., Chicago, Ill., and Jersey Maid Ice Cream Co., 32 Little Nassau, Brooklyn, N. Y., are having sketches made for a dairy plant at Brooklyn. Estimated cost to exceed $200,000. Maturity about October.

Dairy Plant — County Commissioners, Fort Wayne, Ind., awarded contract for the construction of a dairy plant to Max Irmscher & Sons, First National Bank, Fort Wayne. Estimated cost $25,000.

Dairy Plant—E. G. Shuey, 2738 Benevenue Ave., Berkeley, Calif., completing plans for a 1 story dairy plant at McAuley St. and Telegraph Ave., Oakland. Estimated cost $40,000 including equipment. G. Officer, Hotel Claremont, Berkeley, is architect.

Dairy Plant—Titusville Dairy Products Co., H. Rabild, Pres. and Mgr., Titusville, Pa., will soon award contract for a 1 story, 15 x 20 and 20 x 20 ft. addition to dairy plant including boiler house on South Washington St. Braziell & Anderson, 309 4th. Ave., Pittsburgh, are architects.

Dairy Plant—Valley Dairy Co., 548 Colyton St., Los Angeles, Calif., is having plans prepared for a 2 story, 76 x 78 and 65 x 200 ft. dairy plant on Fletcher St. T. R. Cooper Co., Western-Pacific Bldg., Los Angeles, is architect.

Dairy Plant—Weissglass Dairies Co., 2014 Forest Ave., Mariners Harbor, S. I., N. Y., awarded contract for a 1 story plant to Victor Prosi, 64 Mersereau St., Port Richmond. Estimated cost $40,000.

Dairy Plant Addition—White Bros., 50 Brooks St., Quincy, Mass., awarded contract for addition and alterations to dairy plant, to Clark & Smith, 1372 Hancock St., Quincy. Estimated cost $40,000.

Dairy and Creamery Plant — Pennsylvania State College, R. B. Hetzel, Pres., State College, Pa., will soon award contract for a 2 story, 50 x 140 ft. dairy and creamery plant. C. Z. Klauder, 1429 Walnut St., Philadelphia, is architect.

Milk Distribution Plant—Cadjolis Corp., A. Christy, Pres., 704 East 133rd St., New York, N. Y., plans a 1 story, 75 x 100 ft. milk distribution plant at 133rd St. and Willow Ave. Estimated cost $25,000. P. J. Murray, 14 West 45th St., New York, is architect.

Milk Distribution Plant—Sheffield Farms Co. Inc., H. McNabb, in charge, 524 West 57th St., New York, N. Y., awarded contract for a 1 story, 115 x 135 ft. addition to plant on Ocean Ave., Jersey City, N. J., to Deakman-Wells Co., 921 Bergen Ave., Jersey City. Estimated cost $150,000.

Milk Distribution Plant — Telling Belle-Vernon Co., A. F. Gleim, Engr. of Const., 3825 Cedar Ave., Cleveland, O., awarded contract for a 1 story, 50 x 150 ft. plant at Ashtabula to Johnson & Ericson, Lake St., Ashtabula. Estimated cost $60,000.

Cold Storage Plant — Lake View Farm, H. Rogers, Southington, Conn., is receiving bids for a 1 story, 68 x 95 ft. cold storage plant. Estimated cost $40,000. L. J. Thompson, 521 Corbin Ave., New Britain, is architect.

Cold Storage Plant—J. K. Laehn, 129 King St., W., Kitchener, Ont., Engr., is preparing plans for a cold storage plant at Thedford. Estimated cost $100,000. Interested in prices on complete equipment.

Cold Storage Plant—Lyman Farms, Middlefield, Conn., plans the construction of a cold storage plant for fruit. Estimated cost $45,000. L. J. Thompson, 521 Corbin Ave., New Britain, is architect.

Cold Storage Warehouse—Vancouver Ice & Cold Storage Co. Ltd., 11 Yore Ave., Vancouver, B. C., awarded contract for a 3 story, 45 x 76 ft. cold storage warehouse to Smith Bros. & Wilson Ltd., 1267 Richards St., Vancouver. $45,000.

Cold Storage Plant — Wilson & Co., 900 Springwood Ave., Asbury Park, N. J., awarded contract for alterations to cold storage plant to Hall Carpenter Co. Inc., 917 3rd Ave., Asbury Park. Estimated cost $40,000.

Ice Plant—Greenfield Ice & Trucking Co., R. C. Phelps, 56 Union St., Greenfield, Mass., awarded contract for an artificial ice plant on Bernardston Rd., to T. J. Gass Co., 124 High St., Greenfield.

Ice Plant—W. S. Grimes and W. D. Little, Hillsboro, Tex., wants quotations on equipment, etc., for proposed 60 ton ice plant. Estimated cost $60,000.

Ice Plant—Mayor and Council, of Sargent, Neb., plan the construction of a 5 ton electrically driven ice plant. Bids for machinery and materials will be called about October 1.

Ice Plant — Sands Bros., 1099 Goffle Rd., Hawthorne, N. J., postponed rebuilding 2 story ice plant, destroyed by fire, at Rock and Goffle Rds. Estimated cost $40,000. Project abandoned.

Ice Plants—Central Power & Light Co., Alamo Bank Bldg., San Antonio, Tex., awarded contract for large ice storage vault; additions and alterations to ice and power plants, new ice equipment and new unit for light plant and some line extensions at Eagle Lake to E. H. Reese, Eagle Lake. $40,000. Also addition to ice plant including platforms, vaults and installation of additional machinery at Alpine to Sumner Sollitt Co., National Bank of Commerce Bldg., $35,000.

Flour Mill—Doukhobor Community, Veregin, Sask., plans the construction of a flour mill. Estimated cost $75,000.

Flour Mill—Federal Mill Inc., Lohrman Bldg., Buffalo, N. Y., awarded contract for addition to flour mill to Jones-Hettlesater Construction Co., Mutual Bldg., Kansas City, Mo. Estimated cost $90,000. Elevating and conveying equipment will be required.

Mill — Daulphin Milling Co., P. Harrison, Daulphin, Man., plans the construction of a mill. Estimated cost $125,000.

Grain Elevator—Albany Port District Commission, Albany, N. Y., plans the construction of a grain elevator, 2,000,000 bu. capacity. Estimated cost $1,500,000. MacDonald Spencer Engineering Co., Inc., 420 Lexington Ave., are engineers.

Grain Elevator—Burrus Panhandle Elevators, 2701 Alamo St., Dallas, Tex., plans the construction of third unit of grain elevator at Amarillo. Estimated cost $100,000. S. F. Hoehn, Const. Supt.

Grain Elevator — C. M. Moore, Chillicothe, Tex., plans the construction of a grain elevator, 25,000 bu. capacity. Estimated cost $35,000. Private plans. Work will probably start at once using day labor.

Grain Elevator—Salina Grain & Milling Co., L. G. Gottschick, Pres., 912 West Ash St., Salina, Kan., awarded contract for a 56 x 120 ft. grain elevator to include eleven round tanks and ten interstice bins, etc., to Keystone Construction Co., 3525 Broadway, Kansas City, Mo.

Grain Elevator—Spencer Kellogg & Sons, 822 Flour Exchange, Minneapolis, Minn., awarded contract for addition to grain storage elevator including fourteen tanks, total capacity 1,000,000 bu. to Fegles Construction Co., Wesley Temple Bldg., Minneapolis. Equipment including conveyor system and one power-operated automatic shovel will be required.

Grain Elevator — W. T. Townsend and H. Toles, Happy and Amarillo, Tex., awarded contract for the construction of a grain elevator, 40,000 bu. capacity at Happy to Rochelle & Rochelle, Amarillo. $30,000.

Grain Elevator Addition—Archer-Daniels-Midland Co., 600 Roanoke Bldg., Minneapolis, Minn., plans addition to grain elevator including elevating, conveying and screening equipment at Chicago, Ill. Estimated cost $1,000,000.

Grain Elevator Addition—Kansas City Southern R.R., 11th and Wyandotte Sts., Kansas City, Mo., awarded contract for an 85 x 182 ft. addition to grain elevator and grain dryer unit, 1,060,000 bu. capacity at Northeast Industrial District, to M. A. Long Co., 10 West Chase St., Baltimore, Md. Norris Grain Co., F. C. Hoose, V. Pres., Bd. of Trade Bldg., Kansas City, is lessee, also let contract for addition to grain elevator, 600,000 bu. capacity to M. A. Long Co., 10 West Chase St., Baltimore. $120,000. Moore-Seaver Grain Co., Bd. of Trade Bldg., Kansas City, lessee.

Grain Elevator Addition — Missouri Pacific R.R., 13th and Olive Sts., St. Louis, Mo., awarded contract for a 169 x 195 ft. addition to grain elevator, including eighty-one bins each 18 ft. in diameter and 100 ft. high, 2,250,000 bu. total capacity at Kansas City, to E. Ahlskog Co., 1004 Baltimore Ave., Kansas City. Hall-Baker Grain Co., Bd. of Trade Bldg., Kansas City, Mo., lessee.

Grain Storage Building — Farmers National Grain Corp., Nephi, Utah, acquired a site and plans the construction of a grain storage building, 100,000 bu. capacity. Estimated cost $40,000. Architect not announced.

Rice Mill and Elevator—P. Daniels, R. Roach, G. A. Meyers, et al., Stuttgart, Ark., is having preliminary plans prepared for a 300,000 bu. rice mill and elevator. Estimated cost $75,000.

Fish Hatchery—Fish & Game Dept., Washington, D. C., c/o J. R. Russell, Supt. of Bur. of Fisheries, Seattle, Wash., will soon award contract for the construction of a fish hatchery on Snake River in Hagerman Valley, Idaho. Estimated cost $60,000.

Fish Hatchery — State Game Dept., Marble Falls, Tex., is having surveys made for establishment of a fish hatchery near large dam now under construction. Estimated cost $40,000. Private plans.

Meat Products Plant — Stahl-Meyer Co., Wyckoff Ave. and Cody St., Ridgewood, N. Y., awarded contract for a 1 story, 116 x 118 ft. addition to meat products plant to W. E. Anderson, 885 Flatbush Ave., Brooklyn. Estimated cost $45,000.

Packing Plant (Meat)—Banfield Bros. Packing Co., 915 East Apache St., Tulsa, Okla., acquired plant of Fort Smith Packing Co. at Fort Smith, Ark. and plans construction of a new unit. Estimated cost $100,000.

Packing Plant (Meat)—Swift & Co., Union Stock Yards, Chicago, Ill., will soon award contract for a 2 story addition to meat packing plant including refrigeration at Sioux City, Ia. Estimated cost $90,000.

Packing Plant Addition—Armour & Co., 602 West Ray St., Indianapolis, Ind., awarded contract for addition to packing plant to Abel Bros., 8 East Market St., Indianapolis. Estimated cost $40,000.

Poultry Terminal—Union Lines Terminal Inc., c/o O. F. Schlick, 37 Hamilton Ave., Kearney, N. J., awarded contract for a poultry terminal at Weehawken to Fisher-Williams Corp., 110 East 42nd St., New York. Estimated cost $1,250,000.

Poultry Plant — Wickham-Havens Inc., 1510 Franklin St., Oakland, Calif., postponed construction of poultry plant at Concord. Project in abeyance.

Packing Plant—Henry Fischer Packing Co., 1862 Melwood Ave., Louisville, Ky., plans a 4 story, 70 x 90 ft. addition to packing plant. Estimated cost $75,000.

Packing Plant Addition (Citrus)—Canoga Citrus Association, Owensmouth, Calif., awarded contract for a 1 story, 81 x 144 ft. addition to plant at Roscoe and Canoga Aves., to A. S. Barnes, 601 Title Insurance Bldg., Los Angeles. $18,500.

Packing Plants (Citrus) — J. H. Shary, Mission, Tex., is receiving bids for the construction of a 1 story, 110 x 140 ft. citrus packing plant at Harlingen, also 100 x 160 ft. plant at San Carlos, 5 mi. east of Edinburg. Estimated cost $75,000 each. Complete equipment will be required.

Salt Plant — Pennsylvania Salt Mfg. Co., Wyandotte, Mich., awarded contract for superstructure of a 3 story addition to salt plant to Whitehead & Kales Co., 58 Haltinner St., River Rouge. Estimated cost including equipment $70,000.

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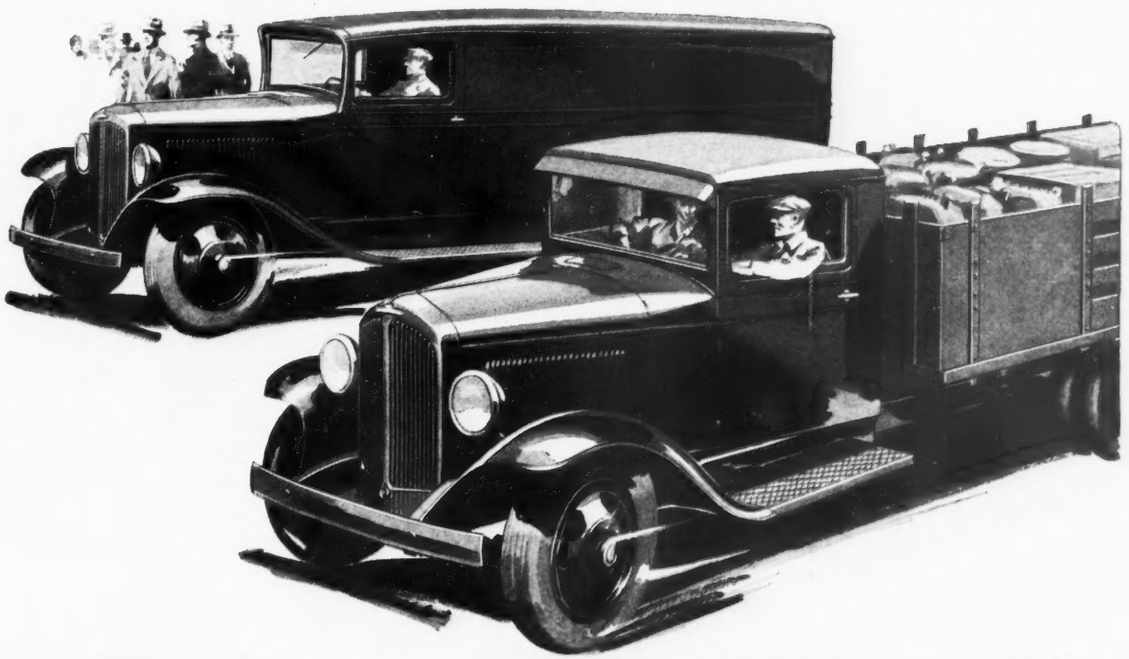

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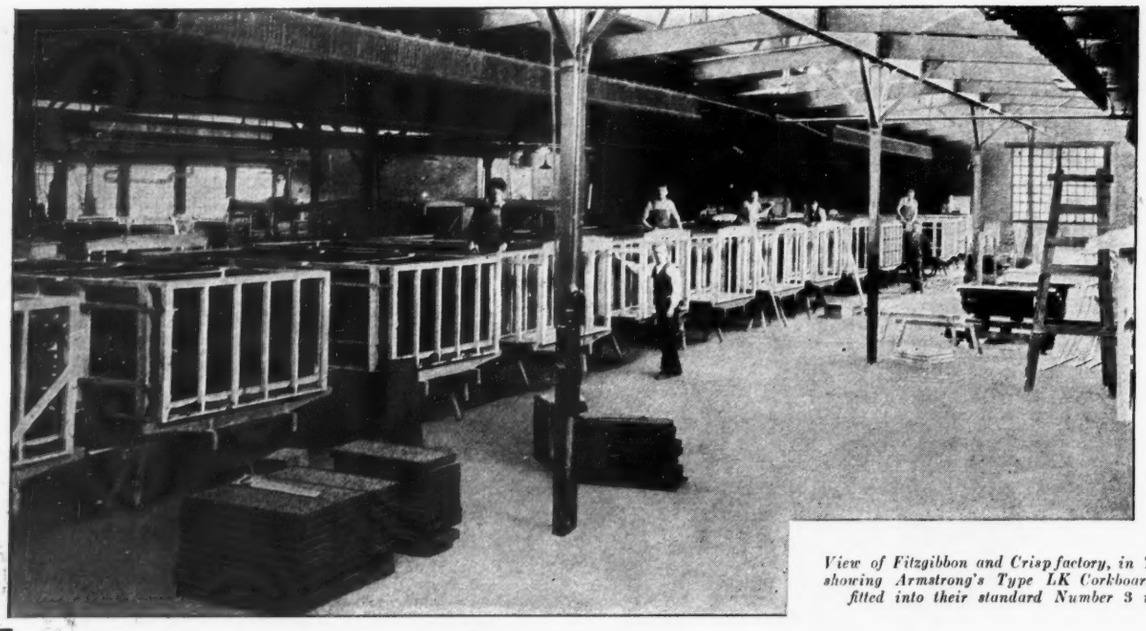


View of Fitzgibbon and Crisp factory, in Trenton, showing Armstrong's Type LK Corkboard being fitted into their standard Number 3 unit.

MORE PAY LOAD PER TRUCK

with Type LK Corkboard Insulation

Armstrong's new product gives more space with less weight . . .

FITZGIBBON and Crisp, Inc., of Trenton, N. J. can tell you how to combine maximum pay-load with minimum refrigeration loss. In the picture above, you see how they insulate refrigerated truck bodies. They use Armstrong's new Type LK Corkboard—the corkboard that is 20% lighter in weight, yet more efficient.

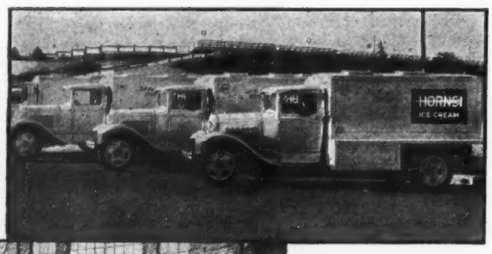
Like Fitzgibbon and Crisp, other leading truck body builders are standardizing on this new, light-weight corkboard. Their truck customers are finding that it pays to insist on this insulation. Its increased efficiency offers greater protection for perishable commodities—especially at quick-freeze temperatures. Its lighter weight permits larger pay-loads.

Armstrong's Type LK Corkboard is one-fifth lighter than standard types of corkboard. Tests show that its coefficient of thermal conductivity is only .263 B. t. u. per hour, per inch thickness, per degree temperature difference at 60° F. mean temperature. Because it is a rigid board, it will not settle with the vibration of a truck, or the slamming of doors.

Ask for Armstrong's Type LK Corkboard Insulation when you buy low temperature equipment. Leading manufacturers are using it for insulation of ice cream cabinets, retail display cases, refrigerated trucks and refrigerator cars. We will gladly send you further information and samples of this new and efficient insulation. Address Armstrong Cork & Insulation Company, 948 Concord Street, Lancaster, Penna.; Canadian offices in Montreal, Toronto, and Winnipeg.

Armstrong's (A) *Product*

Fleet of cork-insulated trucks, built for the Horn Ice Cream Company of Baltimore, by Fitzgibbon and Crisp.



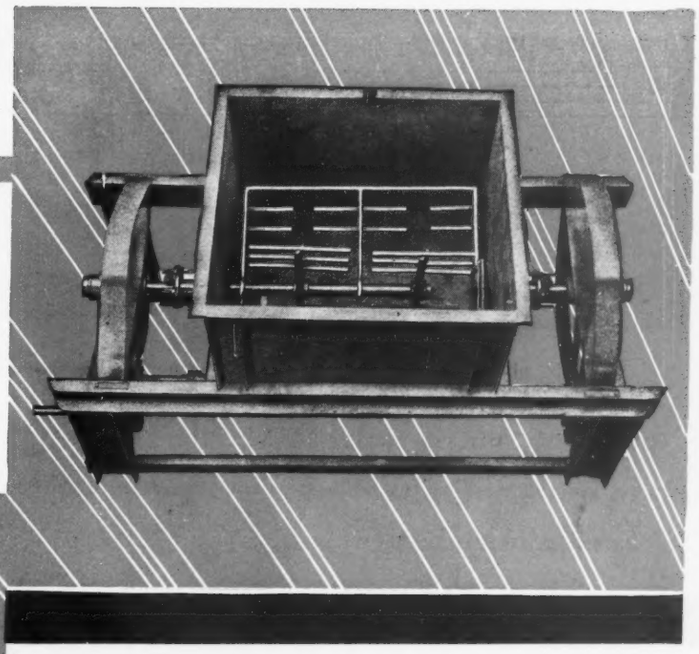
Six inches of Armstrong's Type LK Corkboard help maintain the temperature of —109° F. in this Solid Carbonic Company truck, which has a Fitzgibbon and Crisp body.

Armstrong's TYPE *LK Corkboard*

the most efficient, practical equipment insulation

STAINLESS ENDURO EQUIPMENT

cannot taint food products, corrode or even tarnish—and gives a life-time of economical service.



Stainless ENDURO *double-acting high-speed Agitator used for emulsifying oil—manufactured by the Groen Manufacturing Co., Chicago, Ill.*

Stainless ENDURO *Steam Jacketed Cooking Kettle—manufactured by the Groen Manufacturing Co., Chicago, Ill.*

- IN THE manufacture of delicately flavored dressings, stainless, insoluble ENDURO is now used because it affords positive protection from any taint which might affect the flavor or color of the product.
- The glass-smooth surface of ENDURO requires only a washing to keep it spotlessly clean—absolutely safe for the next batch.
- And manufacturers of food products of all kinds have standardized on ENDURO equipment, because ENDURO is not attacked by food acids, or by the brines used in quick freezing. It is far stronger than ordinary steel, has no plating to chip off, and cleans as readily as glass.
- Manufacturers of all types of food processing equipment are now ready to supply you with this stainless and sanitary metal. Ask Republic to send you complete details.

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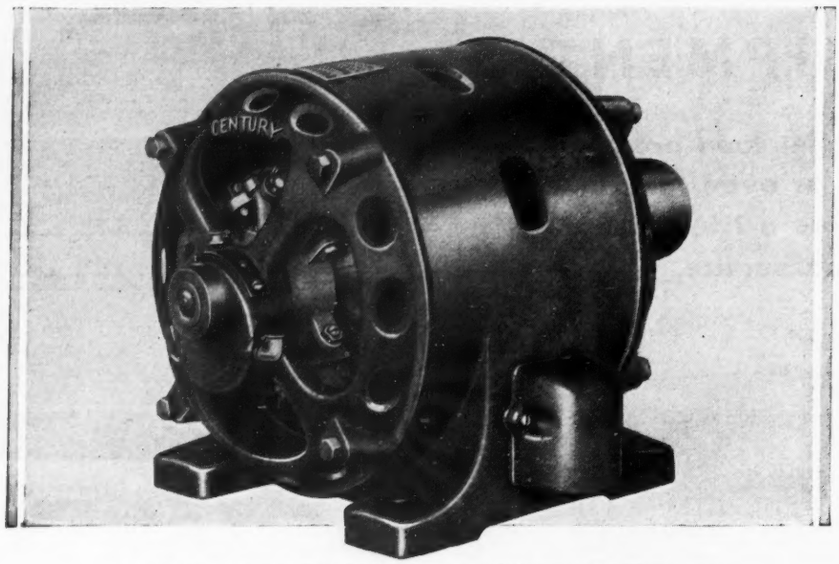
ENDURO

Enduro KA2 is sold only through Republic Sales Offices and authorized distributors.

CENTRAL ALLOY DIVISION
REPUBLIC STEEL CORPORATION
Massillon, Ohio

THEY KEEP A-RUNNING



1 Horse Power Century Type RS Repulsion Start Induction Single Phase Motor

WINDINGS
Insulated and Sealed
RESIST MOISTURE

The thoroughly insulated windings of Century Type RS Motors are form-wound and held securely in well-insulated slots by retaining wedges . . . The entire insulation cell is then saturated with insulating compound and protects the windings against the deteriorating effects of moisture . . . This means continued satisfaction both to the user and manufacturer of motor-driven apparatus—it is only one of many reasons why Century motors "Keep a-Running" even when operating in moist or humid surroundings such as are frequently encountered on pumps, oil burners, refrigerating machines and similar exposed equipment and in tropical climates.

Built in all standard sizes from 1/8 to 40 horse power.

CENTURY ELECTRIC COMPANY
1806 PINE STREET . . ST. LOUIS, MO.
40 U. S. and Canadian Stock Points and More Than 75 Outside Thereof

SINGLE PHASE, THREE PHASE, AND DIRECT CURRENT MOTORS

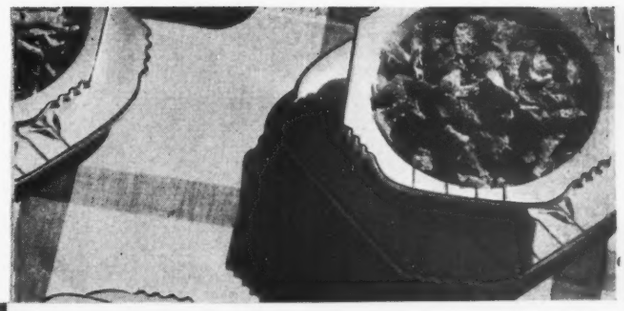
Century MOTORS

MOTOR GENERATOR SETS, ROTARY CONVERTORS, FANS AND VENTILATORS

RS-9-1

FOR MORE THAN 27 YEARS AT ST. LOUIS

CRISPNESS AND FLAVOR IN CEREALS ARE AT THE MERCY OF BAD WEATHER!!



By providing the weather wanted, Manufactured Weather opens up countless possibilities for more profit and a better product to almost any food industry

THERE are very few good days for cereal manufacturers if weather is left to chance. Breakfast foods so quickly lose their crisp, crackly freshness. A bit too much moisture in the packaging room, for instance, and cornflakes, prepared cereals, soluble beverage powders become soggy, sticky.

Again, if the air is too dry the waxed paper used in packaging often gets offsize, develops heavy static charges, snarls up the wrapping machines.

Here is just one instance where Manufactured Weather makes every day a good day . . . takes the gamble out of food processing.

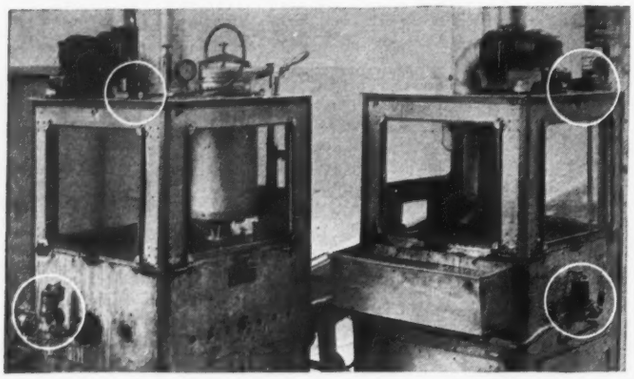
If you make a food that thirstily absorbs moisture from the air, or is sensitive to temperature changes, Manufactured Weather can help you, too. For regardless of outside weather, temperature and humidity can be held constant, at just the right point for best results.

Because you may have been getting along so many years without air-conditioning, you say "Why bother now?" That's the idea that makers of candy, macaroni, baked goods, sausages, bulk goods that ferment, used to have. Now, the progressive plants are finding that wherever Manufactured Weather has been installed, there have been direct savings in dollars and cents. Better, more uniform products have resulted. Weather changes have not delayed production schedules. Guesswork has been eliminated.

Just think for a moment of the places in your processing where weather changes bring difficulties. Think how much better things would be if *you could make the weather.* Then drop a line to our Newark office . . . we'll tell you in detail how Manufactured Weather will improve your processing. Carrier Engineering Corporation, Newark, New Jersey—A Division of Carrier Corporation.

MANUFACTURED WEATHER
by
Carrier
WEATHERMAKERS TO THE WORLD

Large Savings



in frying fat and gas

in this doughnut department

Investigate what automatic temperature control can do for you

The National Tea Company at Minneapolis now fries doughnuts in fat that is *automatically* held at right temperature.

Here are the results of eliminating old hand control methods: Gas savings up to a third or more, as shown by metered "before and after" tests. Important savings in costly frying fat. Uniformity of color and quality of product.

This is a typical instance of the savings that food plants are effecting with Minneapolis-Honeywell automatic controls. These controls adjust combustion at ovens, cookers, vats—provide accurate control of process temperatures, pressures, liquid levels, and flow—exactly regulate room temperatures and air condition to meet process requirements.

The Minneapolis-Honeywell equipment includes a broad line of controllers, motors and motor operated valves. The Minneapolis-Honeywell organization is the largest in the world exclusively devoted to heating and process control problems. Let us help you cut *your* costs. Use the coupon today.

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY
2703 Fourth Ave. So., Minneapolis, Minn.

In Canada: Minneapolis-Honeywell Regulator Co., Ltd., Toronto and Montreal
Branch Offices: New York, Philadelphia, Boston, Providence, Hartford, Detroit, Cleveland, Indianapolis, Chicago, St. Louis, Milwaukee, San Francisco, Syracuse, Rochester, Baltimore.
Export: 801 Second Ave., New York. Cable Address: "Laboramus"

Distributors in all principal cities

Motor Gas Valve

MINNEAPOLIS
INDUSTRIAL REGULATORS
HONEYWELL

Temperature Controller

MINNEAPOLIS-HONEYWELL REGULATOR COMPANY
2703 Fourth Ave. So., Minneapolis, Minn.

☐ Send me pamphlet on Process Controllers.
☐ Send me pamphlet on Unit Heater and Sectional Control Systems.
☐ Have representative call. I understand there is no obligation.

*Name*_____ *Position*_____
*Company*_____
*Address*_____
*City*_____ *State*_____

PURE SOFT WATER *for* PROCESS USES

Soft water is important in steam plants from the "operating cost" angle—but in process work it is important from the "quality angle."

If you have processes where soft water is important—where dependable treatment is necessary—you can trust Graver Water Treating Equipment to give service that guarantees the constant quality of process water.

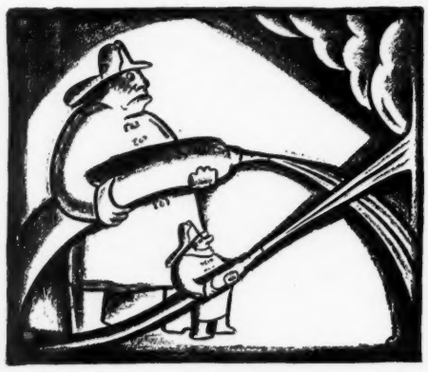
• *Graver is the largest designer and manufacturer of a complete line of Water Treating Equipment* •

GRAVER TANK & MFG. CORP.
East Chicago, Indiana

Manufacturers of

GRAVER
WATER TREATING EQUIPMENT
and
Special and Standard Tanks
Special Steel Plate Construction

The Size of Stream is Governed by the Nozzle



No more water can leave a hose, regardless of its size, than will go through the nozzle.

Likewise, a big cumbersome bucket or float trap, regardless of its pipe connection cannot discharge any more condensation than will pass through its pin-hole discharge orifice.

The Sarco Thermostatic Steam Trap, although only one-third the size of mechanical traps, discharges condensation as fast and as long as it forms. Why pay three times as much for a large trap when a Sarco will do the same work?

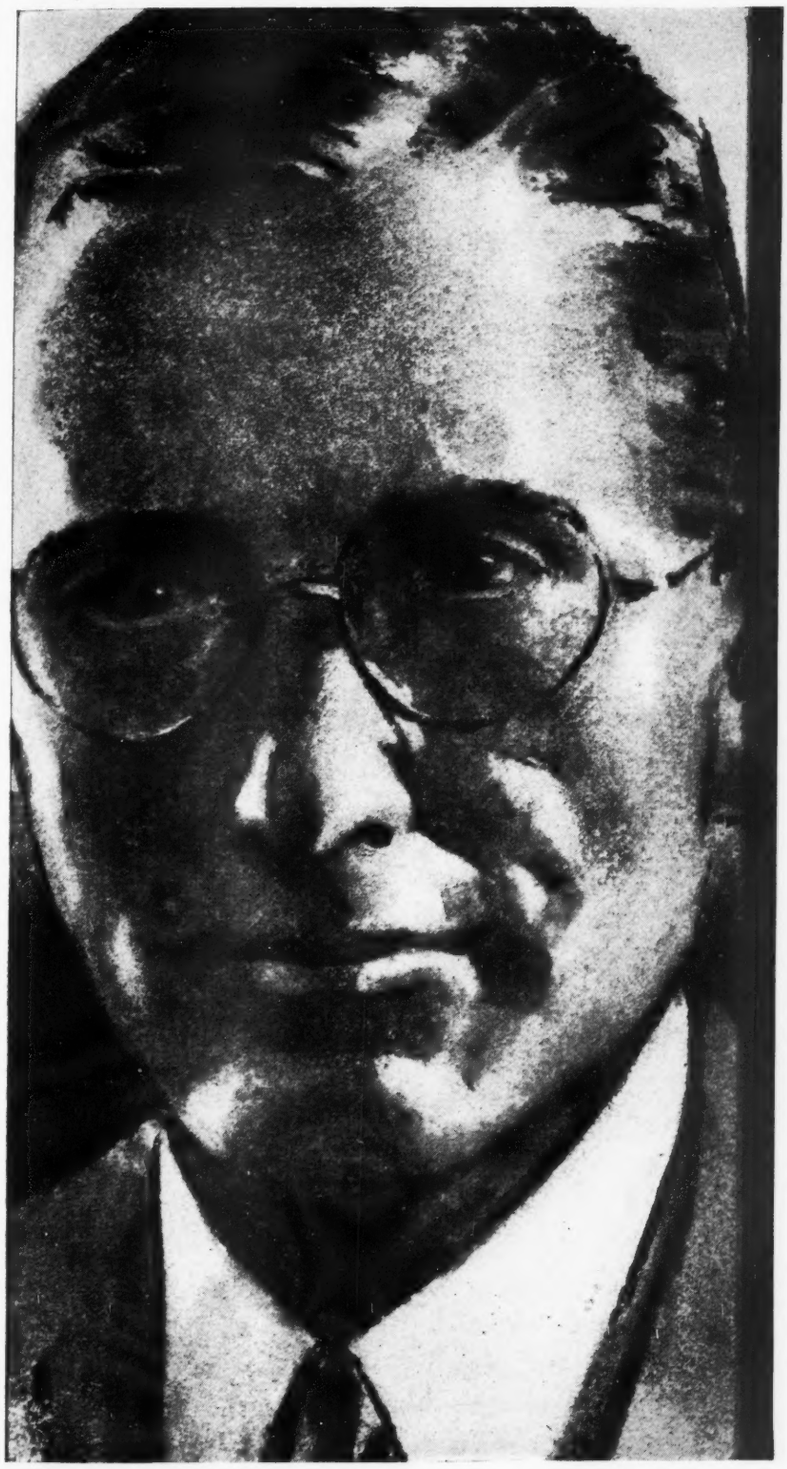
Sarco Steam Trap saves in installation cost too. It is no larger than a street ell and it can be screwed right into the pipe line. That saves building a platform or digging a pit.

Self-adjusting for all pressures up to 100 lbs. More than a million sold. Write for booklet AE-95 and a free trial.

SARCO COMPANY, INC.
183 Madison Ave. New York, N. Y.

Branches in Principal Cities
SARCO Canada Limited, Federal Bldg., Toronto, Ont., Canada
Walker Crosweller & Co., 20 Queen Elizabeth St., London S. E. 1.

SARCO STEAM TRAP



Equipment —plus EXPERIENCE

•

KELVINATOR not only has the most complete line of Commercial electric refrigeration equipment to-day, but also, the longest experience. For seventeen years Kelvinator engineers have studied, experimented, worked unceasingly on every phase of electric refrigeration.

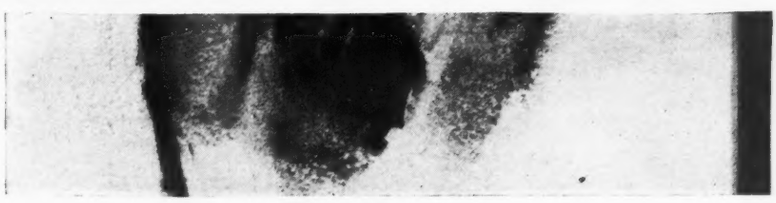
Kelvinator equipment to-day reflects this constant and endless striving toward perfection. Kelvinator Cooling Units—the Cross Fin Coils; the Deep Fin Coils; and the Submersion Type Coils—are regarded as the *fastest,* most efficient cooling coils the industry has developed. Kelvinator Compressors, of which there are 30 different sizes and types, enjoy the same high regard of refrigeration authorities and manufacturers everywhere. And behind the equipment is an unparalleled experience—an experience that is available to food manufacturers who are interested in *better refrigeration for less money.*

Call the Kelvinator Refrigeration Engineer in your city, or write us direct. We will be glad to work with you on your individual refrigeration problems.

KELVINATOR CORPORATION
14271 Plymouth Road, Detroit, Michigan
Kelvinator of Canada, Ltd., London, Ontario
Kelvinator Limited, London, England

Kelvinator

(319)



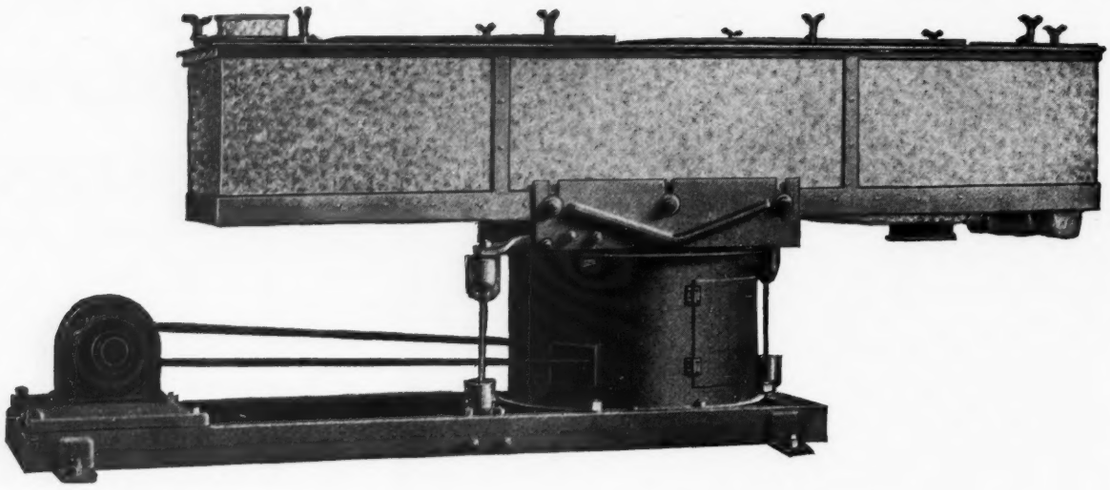
C O U P O N

Kelvinator Corporation, 14271 Plymouth Road, Detroit, Michigan
Gentlemen: Please send information regarding Kelvinator Electric Refrigeration Equipment.

*Name*_____

*Street Address*_____

*City*_____ *State*_____



NEED LARGE CAPACITY?

OR

SMALL CAPACITY?

No matter whether your sifting requirements call for large or small production, complicated or simple separations,—there is a Wolf machine to fit your needs.

WOLF

SUPERSIFTER

This latest addition to our extensive line of sifting equipment develops the maximum capacity of its sieves by giving them a full circular motion at every point, and by use of an efficient sieve cleaning device. Its motion is smooth and rhythmic, without vibration. It is built in sizes with 1 to 96 sq. ft. of sieve and for making 2 to 5 separations at one time.

For details ask for Bulletin—G-1.

THE WOLF COMPANY
200 Commerce St., Chambersburg, Pa.
New York Office, 18 E. 41st St.

There are Other Wolf Machines for

CRUSHING
GRINDING
DRYING
MIXING
PACKING

Civilization Follows this Flag

Before man can push back the frontiers of progress and expand his territories, he must insure a safe, protected food supply.

Today he is carrying civilization to the uttermost corners of the earth because good food can follow him there! He can depend on a variety of safe foods protected against loss and spoilage, through modern packaging.

KVP

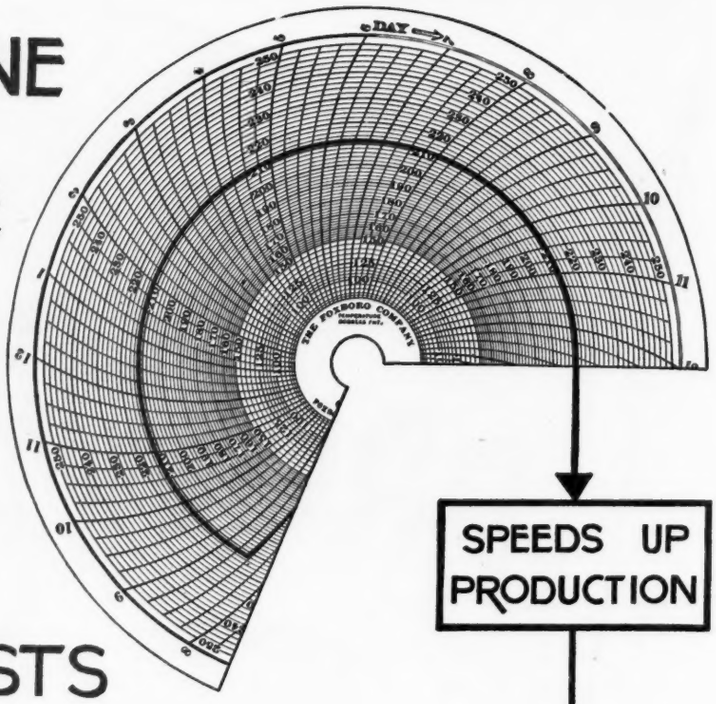
PROTECTIVE PAPERS

. . . are endorsed by all departments of the food industry because of the conspicuous part they are playing in this important service. All foods, dry or fresh, moist or wet;—all are analyzed and studied to determine the exact wrapper their chemical and shipping conditions call for.

Our Laboratory and experts are at your disposal with advice on your specific wrapping problem.

KALAMAZOO VEGETABLE PARCHMENT CO.
KALAMAZOO - - - - MICHIGAN

STRAIGHT-LINE TEMPERATURE CONTROL — REDUCES PRODUCTION COSTS



SPEEDS UP PRODUCTION

ELIMINATES WASTE

REDUCES OPERATING COSTS

RESULTS IN UNIFORM PRODUCT

FOXBORO Temperature Recorder-Controllers reduce canning production costs. These instruments consistently maintain the required temperatures, thus eliminating the uncertainties of operation.

On retorts, open cookers and peelers, Foxboro Temperature Controllers bring the temperature quickly to the required point—hold it on the line during the process—and repeat the operation day after day with a minimum of attention.

This type of operation results in a more uniform product—produced in a shorter time—with a marked saving in steam and labor.

You can rely unconditionally on the accuracy of Foxboro Temperature Controllers. They are designed to meet the requirements of the canning industry.

We will gladly recommend the most economical instrument for your application. Write to Dept. B.

THE FOXBORO COMPANY
NEPONSET AVENUE, FOXBORO, MASS., U. S. A.

NEW YORK, CHICAGO, BOSTON, PHILADELPHIA, DETROIT, PITTSBURGH, CLEVELAND, ROCHESTER, N. Y., ATLANTA, LOS ANGELES, DALLAS, TULSA, PORTLAND, ORE., SAN FRANCISCO, SALT LAKE CITY

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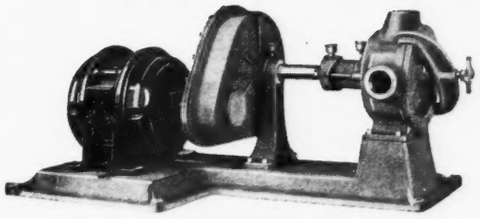
FOXBORO
REG. U.S. PAT. OFF.
THE COMPASS OF INDUSTRY

INSTRUMENTS *for* CONTROLLING, RECORDING *and* INDICATING TEMPERATURE, FLOW, HUMIDITY *and* PRESSURE

«VIKING»



pays big dividends in

PUMP PERFORMANCE

The sanitary rotary pump that will do its given job the best is naturally the pump you want. The Viking is high in efficiency. It handles its capacity load with less power. As a result of its simple design . . just two moving parts . . it is exceedingly easy to clean. The Viking starts without priming and pumps with a smooth, even flow . . no pounding, splashing or churning. In thousands of plants . . Viking is paying big dividends in performance. Viking offers very definite economies that you should be enjoying in your plant.

Free Viking Catalog

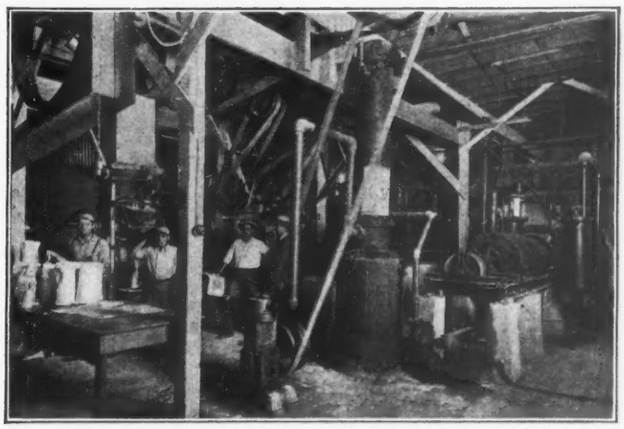
Investigate Viking before you invest in pumping equipment. Your inquiry will bring FREE Viking Catalog and Special Food Plant Bulletin. Write today.

Viking Pump Company
CEDAR FALLS, IOWA

VIKING PUMPS

ANOTHER UNUSUAL PROBLEM SOLVED

Modernizing the Making of Mexican Meal



STOKES Vacuum Rotary Dryers—drying "Nixtamal" corn meal

FOR over 6,000 years, the Mexican housewife has had to grind her "Nixtamal" corn meal daily to prevent its souring. STOKES Vacuum Rotary Dryers now dry this meal so that it can be stored indefinitely.

The solution of this interesting process problem, reached by using STOKES Equipment, is only one of hundreds in which we have participated.

Our 36 years' experience, a fully-equipped testing laboratory, and a complete manufacturing plant are at your service. Consult us on the equipment listed.

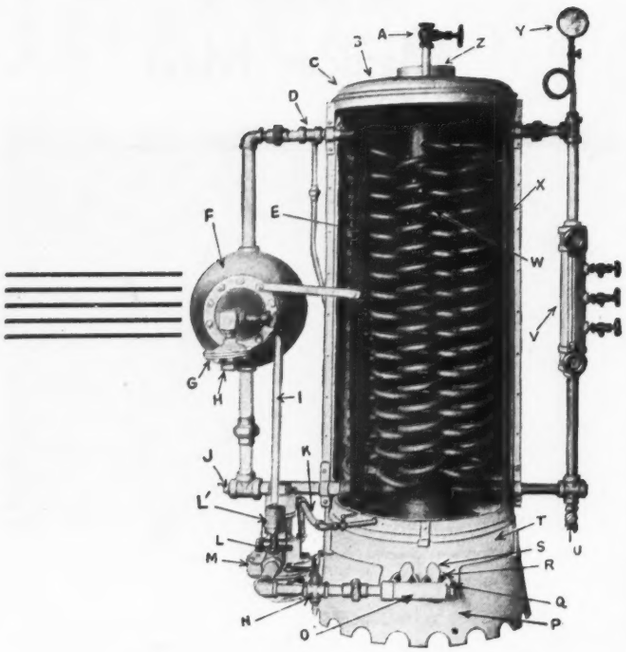
- Vacuum Rotary Dryers
- Atmospheric Drum Dryers
- Vacuum Shelf Dryers
- Starch and Food Dryers
- Evaporators
- Tablet Compressing Machines
- Solvent Recovery Apparatus
- Tube and Jar Fillers and Closers
- Powder Fillers and Cappers
- Extractors
- Mixers
- Vacuum Stills
- Vacuum Mixing Pans
- Autoclaves
- Condensers
- High Vacuum Pumps
- Vacuum Fumigators
- Water Stills

Special Process Equipment

Send for our new Catalog No. 31. 48 pages — illustrated with many interesting and suggestive installations in the food industries.

F.J. STOKES MACHINE COMPANY
Chemical Engineers and Equipment Manufacturers since 1895
5976 TABOR ROAD OLNEY P. O. PHILADELPHIA, PA.

Speed!



"Steam in 4 minutes"

Ofeldt

TRADE MARK

The automatic Ofeldt Gas Boiler has the reputation of being the fastest steaming process steam boiler . . . Steam from cold water 4 minutes after lighting the gas . . . That's real speed!

Where process steam loads are intermittent, with unavoidable or long intervals between, an Ofeldt Gas Boiler is supremely economical.

Consider the advantages of speedy steam generation—Idling costs, together with delays, are eliminated. Steam need be generated only when required . . . When you add the factor of speed to all the other advantages of gas-firing, the extraordinary economies of the OFELDT are very evident.

Style A Ofeldts are constructed for 100-lbs. working pressure and an official certificate of inspection supplied for each boiler. The Ofeldt operates efficiently at any pressure setting from 1-lb. up and is available in a convenient range of sizes from 25 hp. down to ¾ hp. Special Ofeldt boilers have been built for pressures as high as 500-lbs.

Send for Catalogue 3A and on page 8 you will find the story of the lettered arrows.

MEARS-KANE-OFELDT INC.

1903-1915 EAST HAGERT ST. PHILADELPHIA

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BUG HADES

With

LARVACIDE
(Chlorpicrin)
REGISTERED

The Ideal Fumigant

A quick killer of bugs, weevil, moths, mites, beetles and rodents in all stages from egg to adult.

Larvacide is safe for your men to use. It is self-announcing to humans. Leaves no odor, nor will it discolor food stuffs. Inquire about our "Control Method."

LARVACIDE SERVICE, INC.
Division
ISCO CHEMICALS
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117-119 LIBERTY STREET, NEW YORK.

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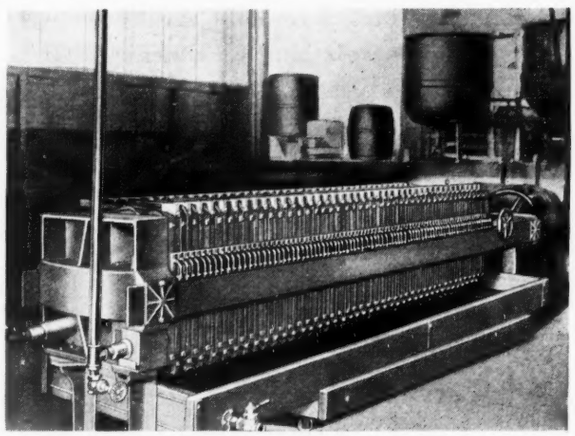


SHRIVER FILTER PRESSES FILTER FOOD STUFF

In the preparation and manufacture of food, Shriver Filter Presses are used by the leading food companies to secure that clarity and sparkling appearance so essential, particularly in foods packed in glass. The Red Wing Company, Fredonia, N. Y., use Shriver Filter Presses, successfully.

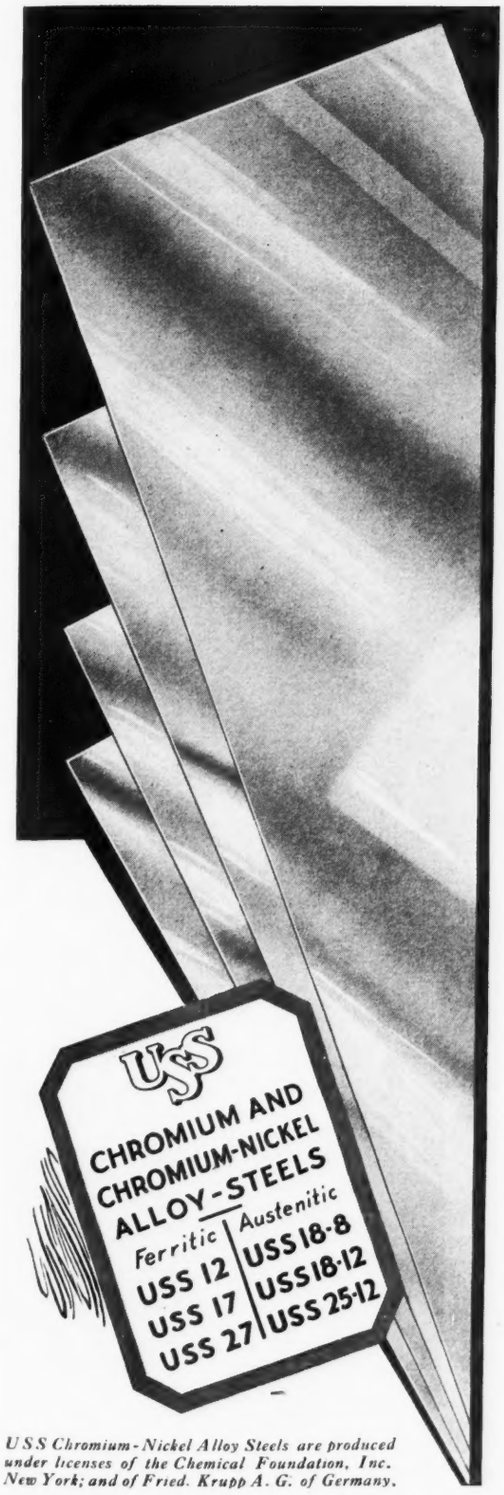
Your inquiries are solicited.

T. SHRIVER & COMPANY
Established 1860
860 Hamilton Street Harrison, N. J.

A Filter Press For Every Purpose

SHRIVER

Filter Presses Filter Cloth Diaphragm Pumps



U S S Chromium-Nickel Alloy Steels are produced under licenses of the Chemical Foundation, Inc. New York; and of Fried. Krupp A. G. of Germany.

AMERICAN USS STAINLESS AND HEAT RESISTING STEEL SHEETS

FOR all applications in which appearance and beauty, effective resistance to corrosion, and unusual physical properties are important considerations, the alloy steels of the U S S series are giving a most satisfactory answer to the question—*what metal is adaptable?*

In a variety of grades and finishes, U S S Stainless Steel sheets and light plates are produced by the American Sheet and Tin Plate Company. Your selection for particular requirements may be made with the assistance of our technologists, who will be glad to serve you. Descriptive literature will be furnished promptly upon request.

This Company manufactures high grade sheet and tin mill products for all known uses. Write for full information on AMERICAN Black and Galvanized Sheets, Special Sheets, Tin and Terne Plates; and KEYSTONE Rust Resisting Copper Steel products.

American Sheet and Tin Plate Company

GENERAL OFFICES: Frick Building, PITTSBURGH, PA.

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

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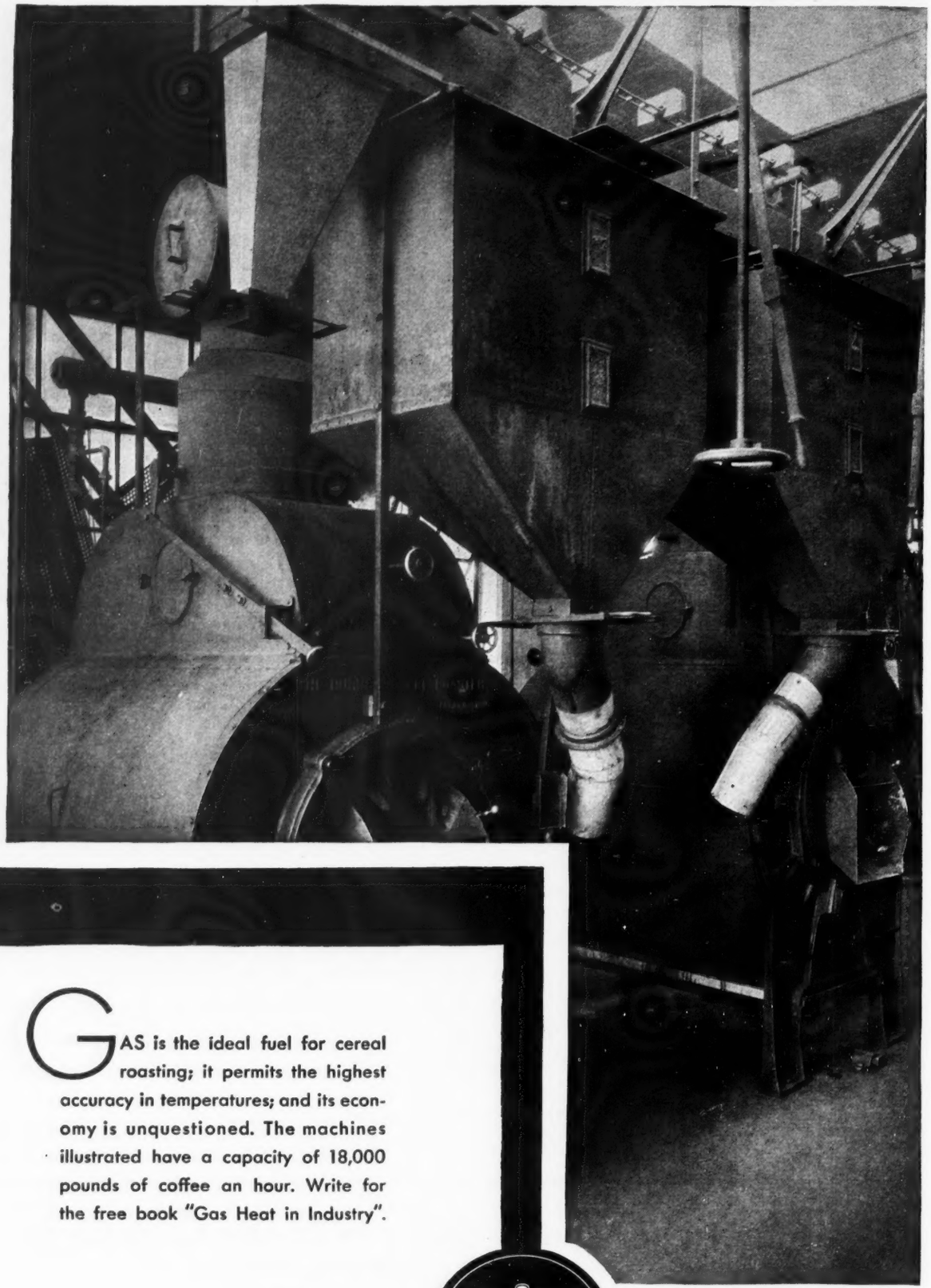
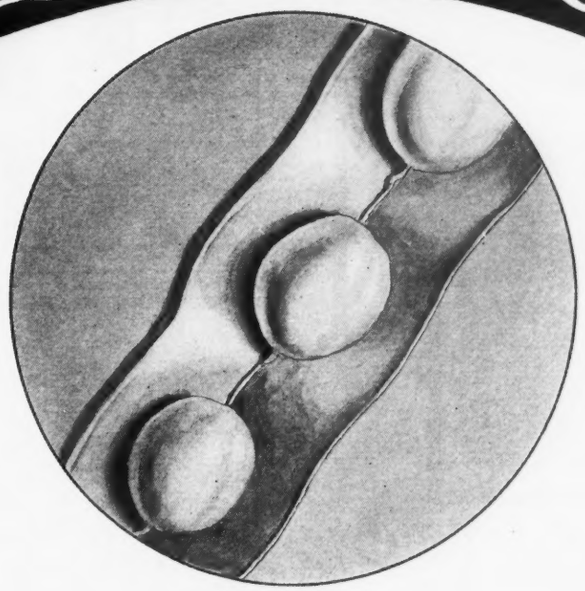
GAS FOR HEAT WHEREVER HEAT IS NEEDED



GAS is the ideal fuel for cereal roasting; it permits the highest accuracy in temperatures; and its economy is unquestioned. The machines illustrated have a capacity of 18,000 pounds of coffee an hour. Write for the free book "Gas Heat in Industry".

AMERICAN Gas ASSOCIATION

420 Lexington Avenue New York



Like peas in a pod . . . .

ALL *Tycos* CONTROLLED BATCHES ARE UNIFORM

USE *Tycos* CONTROL . . . . . .USE *Tycos* CONTROL

Maintaining constant cooking temperatures and uniform results is next to impossible without accurate instrument-control. If you don't believe it, put a *Tycos* Recording Thermometer on a cooking kettle. Don't look at it until the batch is emptied. The wavy, erratic line on the *Tycos* chart will tell its own story of cooking inefficiency. Now install complete *Tycos* Control and forget about the batch. The *Tycos* system keeps a record, yes, but far more important it *controls the temperature* and time so that every batch is identical. It eliminates watching, guesswork, labor and waste.

The preliminary processes of blanching and exhausting are also important and should have proper temperature control.

A new Canner's Catalog, Part 500 is just off the press. May we send a copy?

Tycos

Taylor Instrument Companies

Rochester, N. Y., U. S. A.

New York	Indianapolis
Chicago	San Francisco
Boston	St. Louis
Philadelphia	Cincinnati
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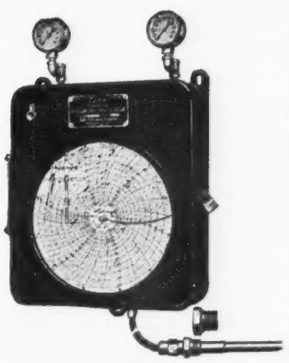

THE CO-OP., TOO, KNOWS VILTER

Not only in food processing is Vilter ice-making and refrigerating machinery considered the standard... but in every other phase, as well.

For instance... the Bellingham plant of Washington Co-Operative Egg & Poultry Association uses an installation engineered by Vilter.

Here, with a Vilter Vertical (7½ x 7½) food storage is safe, simple, certain. The various desired temperatures are held unvarying for long periods.

And so economical is the operation of Vilter-designed systems that accurate control of temperatures is maintained at all times at the minimum cost.

For any application of refrigeration consult our Engineering Department. Write!

THE VILTER MANUFACTURING CO.
2115 So. 1st Street - Milwaukee, Wis.

SINCE *Vilter* 1867

ICE-MAKING AND REFRIGERATING MACHINERY

The Vilter Manufacturing Co.,
2115 So. 1st St., Milwaukee, Wis.

Gentlemen:

Please send me information regarding refrigeration for

.....

Name.....

Address.....

15-31

CITRIC ACID

Merck's Citric Acid is the Gold Medal Standard for food, confectionery and beverage products. We have had 58 years of experience in the manufacture of this article... Merck's Citric Acid is supplied in the crystal, granular and powder forms... Shipped in kegs, barrels or carloads... Also Lactic, Tartaric, Phosphoric and other acids...

Elliott Cresson Gold Medal awarded for perfection of product.

SODIUM BENZOATE

Merck's Sodium Benzoate is white, clearly soluble, and free from foreign odor or taste... Approved by the manufacturers of delicately flavored products.....

METHYL SALICYLATE

One of Merck's "taste-like-more" flavors for fine confectionery, extracts, birch beer and other food products... Imparts the true flavor of Wintergreen... Our facilities are unlimited. Stocks fresh and pure. Put up in convenient 50 lb. tins or larger...

CREAM OF TARTAR

MILK SUGAR

VANILLIN

and many other products

FOR DAIRY CONTROL

Our Ether Concentrated and Benzin Purified are especially designed for large-scale fat determinations in the control of dairy products....

The services of our Sales Organization and the scientific resources of our laboratories are at your disposal in the selection of products adapted to your needs.

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INC.

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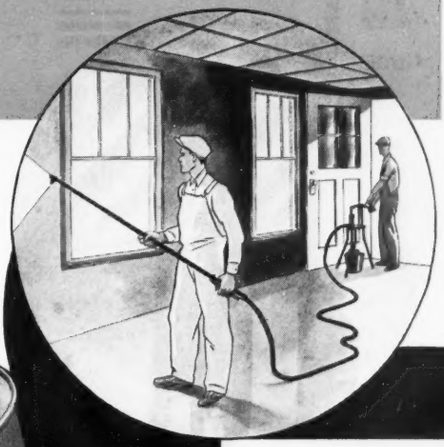
...HTH DESTROYS PACKING PLANT MOLD

FOOD Dold QUALITY PRODUCTS



HTH is a stable, dry, readily-soluble calcium hypochlorite containing 65% of available chlorine — more than twice as concentrated as ordinary chlorinated lime. HTH does not lose its exceptionally high strength either in winter or summer . . . or during long periods of storage. Its use requires no special equipment and involves no returnable containers. HTH is shipped in cases of one dozen-4 lb. cans and HTH-Technical in 110 lb. drums.

HTH
A Superior Product for Convenient and Accurate Preparation of Bleaching and Sterilizing Solutions
Stable — Readily Soluble — Uniform Concentrated
The HTH in this package contains 2½ lbs. Available Chlorine
Manufactured by
The Mathieson Alkali Works (Inc.)
250 Park Avenue, New York City

Where and How to Use Sodium Hypochlorite in the Packing Plant*

Where to Use	Strength	How Applied
Floors, walls, ceilings, edible-rooms: killing floors, cookers, freezers, curing and dry-sale rooms, etc.	From 0.4% strength to 100 p.p.m. (1 gal. of 0.4% solution to 40 gal. of water).	Spray floors, walls, ceilings, etc.; if meat products are present, cover them; rinse equipment afterward.
Equipment and utensils.	0.4% solution.	Clean thoroughly; sterilize by spraying, rinse with clear water after 10 min. exposure.
Toilets, urinals, wash basins, drains, sewers, cuspidors, waste cans, etc.	0.4% solution.	Spray or add the solution direct as needed.
Treating water in reservoirs, condenser systems and for use on drip pans under brine coils.	From 35 to 100 parts per million (1 gal. of 0.4% solution to 40 gal. of water).	Introduce into water reservoir, wells, or cisterns, as required. with effective mixing.

***Adapted from chart prepared by the Institute of American Meat Packers. Complete chart reproduced in "Food Plant Sanitation." Write us for your copy.**

IN HTH, progressive packers find an effective answer to the serious problem of meat plant mold and in addition a sterilizing agent that is both economical and dependable. Here's what Mr. G. L. Talley, vice president of the Jacob Dold Packing Co., Buffalo, N. Y., writes: ● "We are very glad to advise you that we are using your HTH with very good results. We are using it as a spray for the control of mold and sterilization in practically all of our departments, and are well satisfied with its results." ● For all around plant sanitation, no other product is so safe, economical, easy to use. HTH more than pays for itself by safeguarding profits . . . by promoting product quality. Order it through your regular supply house or write direct for literature and prices.

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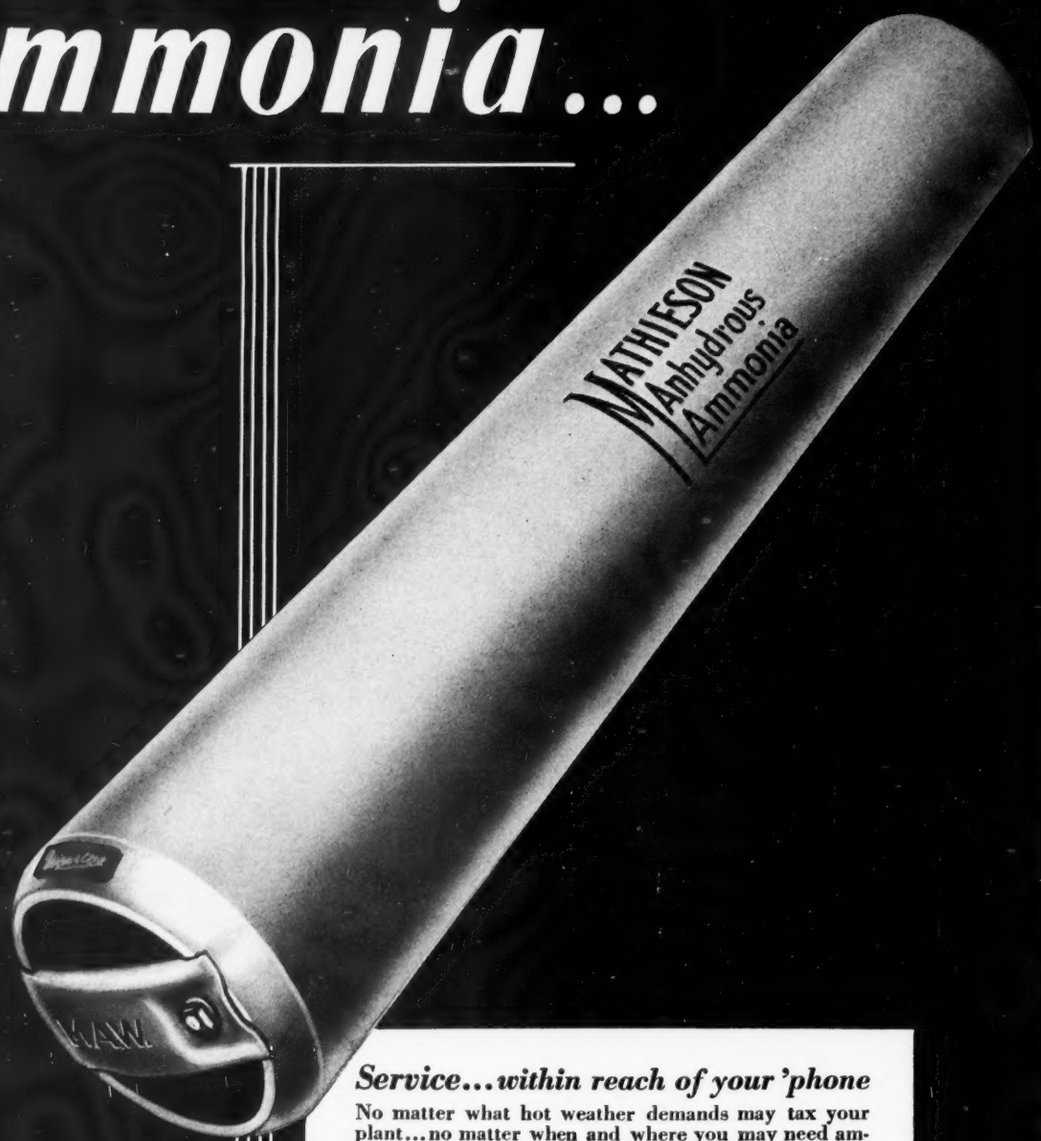
MATHIESON
Ammonia...



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Service...within reach of your 'phone

No matter what hot weather demands may tax your plant...no matter when and where you may need ammonia, there's always a feeling of safety in knowing that Mathieson Ammonia service from over sixty conveniently located warehouses is within reach of your telephone. Year after year refrigerating engineers specify Mathieson Anhydrous Ammonia. They know that Mathieson means product quality plus prompt, courteous service.

Let us send you a Mathieson "Ammonia Reminder Card"

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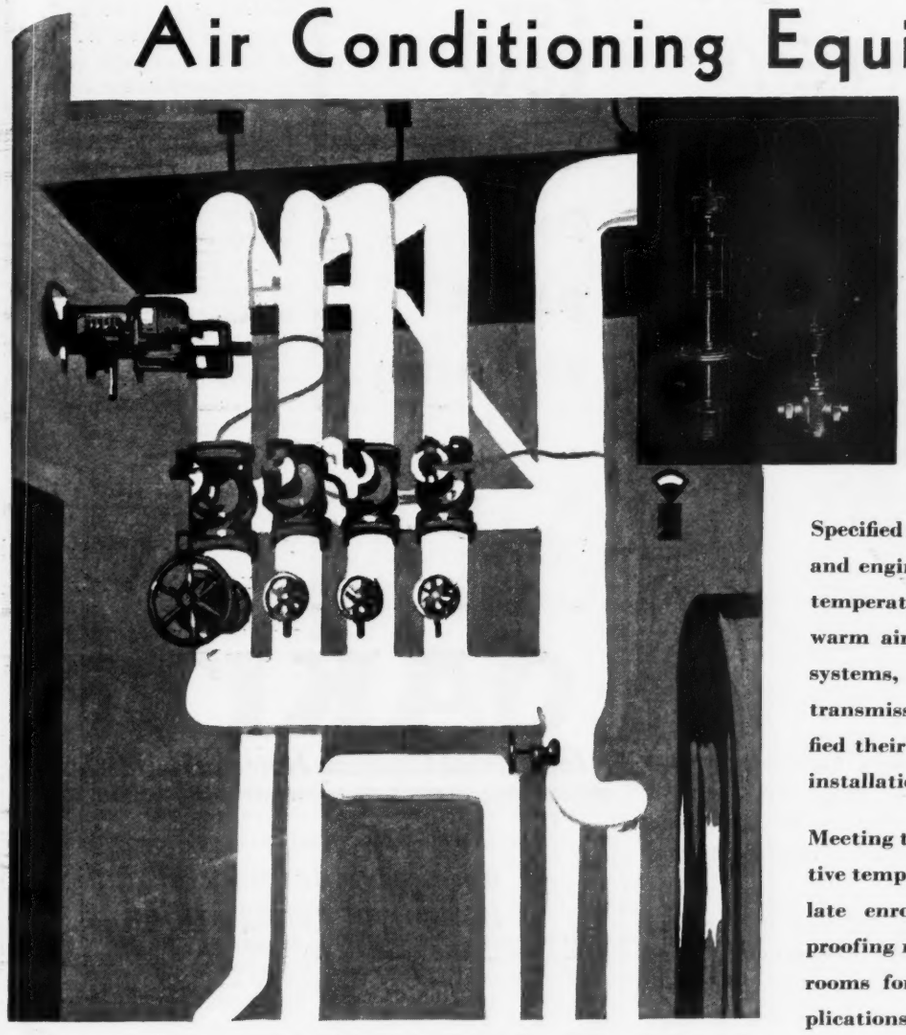
Soda Ash...Caustic Soda...Bicarbonate of Soda...HTH (Hypochlorite)...Liquid Chlorine...Bleaching Powder...Ammonia, Anhydrous and Aqua...PURITE (Fused Soda Ash)...Solid Carbon Dioxide

For Accurate temperature control of Air Conditioning Equipment —



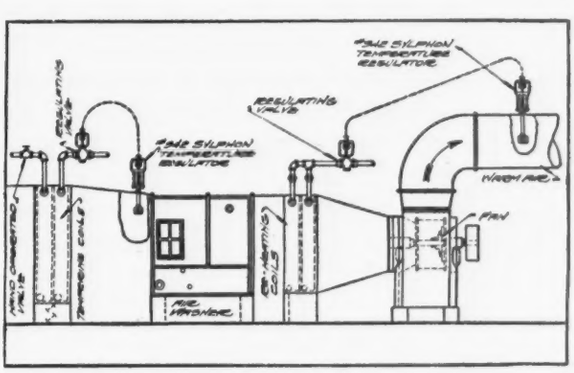
Sylphon TRADE MARK No. 942 REGULATOR has exclusive and superior features

Specified for many years by leading architects and engineers, for the automatic control of temperatures of indirect heating stacks, warm air ducts or fan and blower heating systems, the Sylphon No. 942 separable transmission type regulator has fully justified their recommendations in a long list of installations.

Meeting the most exacting demands for positive temperature control of air, in the chocolate enrobing rooms of candy factories, proofing rooms in bakeries and refrigerating rooms for widely diversified industrial applications, Sylphon No. 942 Regulator has never been approached in excellence of design, construction and efficient service.

Aside from the fact that it may be easily and quickly adjusted for any temperature within its range, the outstanding and exclusive features of this No. 942 Regulator, are:

1. **Valve may be located at some distance from the thermostatic head.**
2. **The Regulator may be installed in any position—from top, bottom or side of duct.**
3. **Thermostatic head is readily removed from the stem, allowing the hole cut through duct or chamber to be only large enough for ¾" pipe.**
4. **All the thermostatically active part of regulator is located within duct or chamber and operation of instrument is unaffected by temperature changes surrounding the transmission unit.**
5. **Separable transmission unit assures great convenience in installing.**



SEND FOR COMPLETE DETAILS

Our illustrated bulletin giving details, diagrams, installation pictures and dimensions pertaining to this No. 942 Regulator, will be gladly sent to interested persons. Get your copy. Ask for Bulletin NG 175.

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FOR GREATER *EFFICIENCY*

This modern Motoco Industrial Thermometer means greater efficiency in your plant production. It registers the correct temperature, of course, and *its clear-visioned dial makes incorrect temperature reading less likely.*

Its bold black-and-white dial and brilliant red pointer can be read plainly 20 feet away. When desirable, it may be installed upwards of 50 feet from where the temperature actually is taken . . . permitting you to mount all your gauges on one central control panel.

Motoco instruments of similar design are available for temperatures ranging from —40° to 750° Fahrenheit.

The Motoco permits you to bring your thermometer equipment up to date with modern, accurate, easy-to-read equipment. Our nearest representative will gladly discuss with you its other advantages and *greater profits* to your company.

Moto Meter also manufactures a complete line of vacuum and pressure gauges

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GAUGE & EQUIPMENT CORPORATION

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FACTORIES AT TOLEDO ' LA CROSSE ' CANADA
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For LOW COST food plant cleaning

BACTERIA and mold grow more rapidly during the hot summer days, making necessary closer attention to every cleaning operation in your plant. But maintaining a high standard of sanitation need not cost you more, if you use Oakite for washing kettles, conveying and filling equipment, bottles, jars, cans and utensils.

Oakite cleans easily and quickly, but most important rinses readily. Leaves every surface clean and sanitary.

Drop us a line, let us tell you how Oakite can save you money. No obligation.

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Up-to-date commercial and industrial refrigeration

This book brings you the answers to many questions on the theory, design, installation, operation and testing of modern refrigerating systems. It is a practical, complete handbook for operating engineers in refrigeration plants, engineers engaged in designing and installing refrigerating equipment, and the man employed in servicing household refrigerators.

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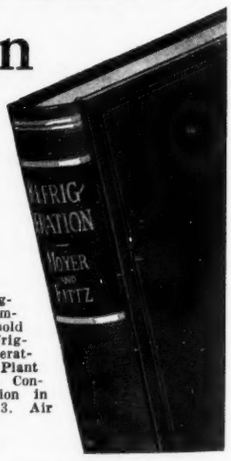

Chapter Headings—

1. Refrigeration Methods. 2. Systems of Refrigeration. 3. Properties of Refrigerants. 4. Compressors for Refrigerating Plants. 5. Household Mechanical Refrigeration. 6. Operation of Refrigeration Systems. 7. Thermodynamics of Refrigerating Systems. 8. Refrigeration Economies and Plant Testing. 9. Ice Making. 10. Cold Storage Construction. 11. Air Circulation and Ventilation in Cold Storage. 12. Cold Storage of Foods. 13. Air Conditioning and Cooling.

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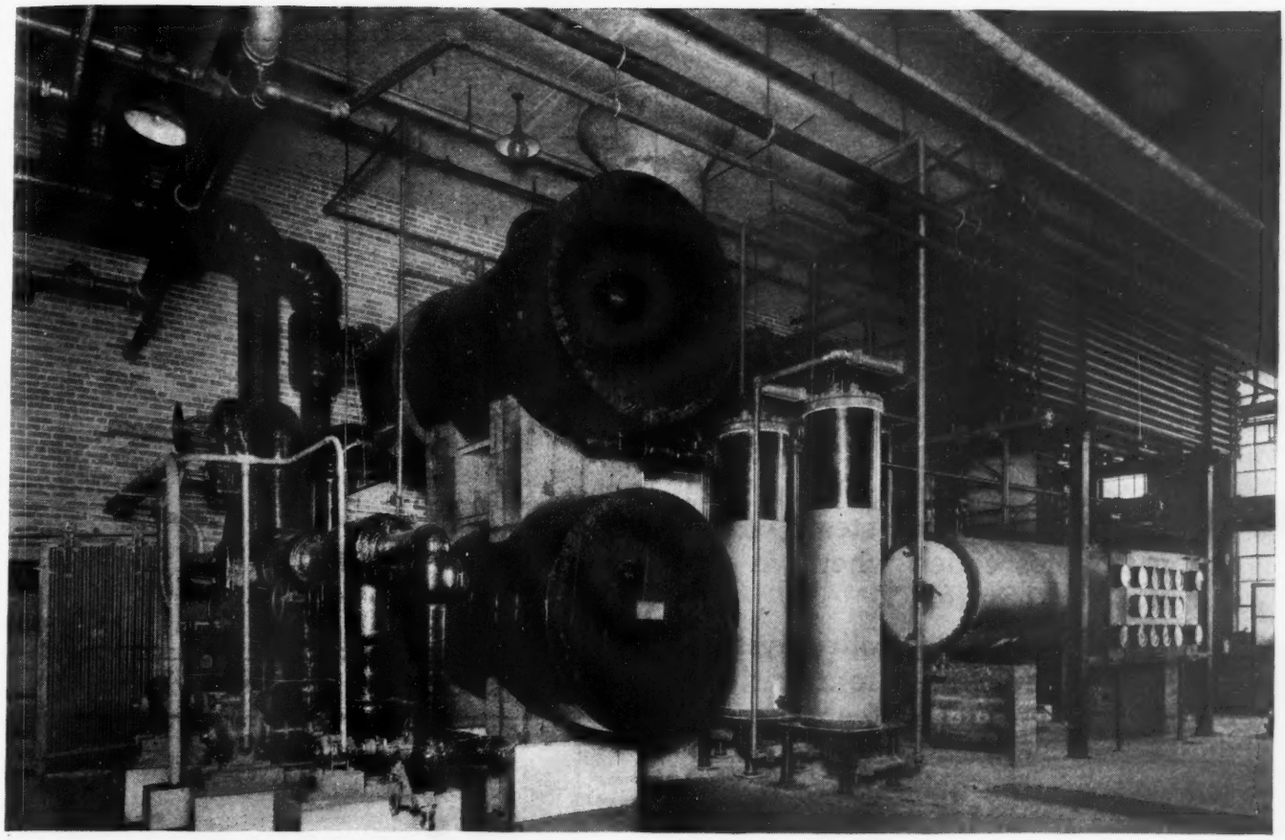


Humidity controlled . . . .

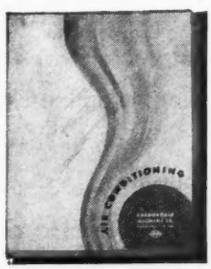
with Exhaust Steam Refrigeration

Less than ⅓ mechanical horse power per ton is required by the Carbondale Refrigeration system at the National Candy Company. Exhaust steam taken from their uniflow engine supplies all the additional power. A silent effective and inexpensive refrigerating system is the result.

Brine is cooled to the desired temperature by this Carbondale Refrigerating System. It is then circulated through the air washers in the eight story building and provides for every floor the proper temperature and humidity for the various processes of candy manufacture.

Here 200 tons of refrigeration is required, and a Carbondale Exhaust Steam Absorption System proved most effective. In other applications Carbondale Compression Refrigerating Systems have been installed. A choice between the two involves a careful consideration of local conditions in every instance, in other words, engineering.

Refrigeration that is engineered to any specific need is assured when you specify Carbondale, whether it be for manufacturing process . . . food preservation . . . manufacturing ice . . . or air conditioning. The knowledge acquired during 40 years of pioneering is at your service when you send your inquiries to Carbondale.



AIR CONDITIONING . . . HELPFUL data to aid calculations . . . tables and charts . . . theoretical problems presented and solved! You will find this book of considerable interest and assistance. Write for a copy.

THE CARBONDALE MACHINE CO., Carbondale, Pa. *Branches in principal cities*

Carbondale Refrigeration

ABSORPTION AND COMPRESSION AMMONIA CARMACO SYSTEMS AND CO_2 COMPRESSION SYSTEMS

CARBONDALE AMMONIA COMPRESSION REFRIGERATING SYSTEMS USE WORTHINGTON "FEATHER VALVE" COMPRESSORS

Since we met the Morehead *Engineer . .*

"Our Steam Circulation Troubles Ended"

One user* writes from Indiana, "I am glad to report that our steam circulation troubles ended when we got our Morehead System".

A Morehead Back-to-Boiler System will give you immediate and thorough drainage of all steam-heated equipment—heating, drying, cooking, evaporating and other process apparatus. It will feed the condensate back to the boiler at exceptionally high temperatures.

Morehead Systems greatly improve heat transference, speed up production, and definitely insure fuel savings and lower operating costs.

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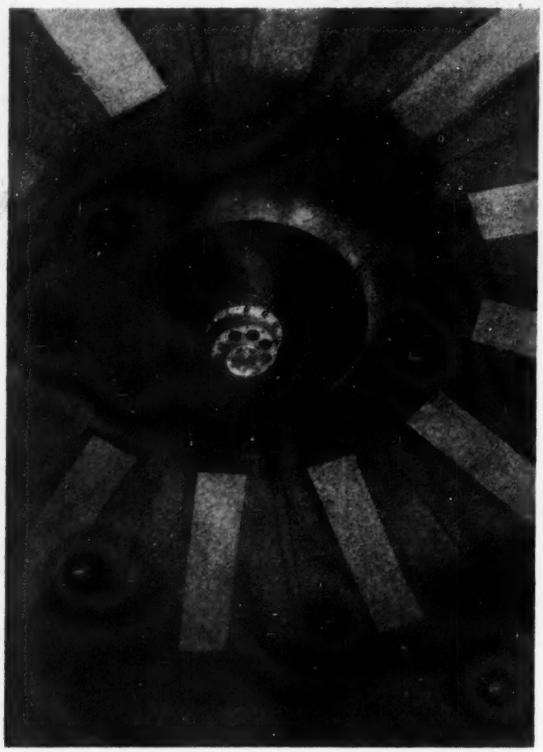

Take an old product and make it new by Unit Spray-Drying. You can do this easily and at moderate first cost. Your initial capital risk will not be great and your equipment can grow with the market for your product . . . *Now a New Product with a New Market.*

High speed, motor driven disc atomizers are used in our Unit Spray Driers. These atomizers are simple, have a long life, and will atomize anything that can be pumped through an 1½" pipe. Sludges, slurries, solutions, suspensions . . . are all alike to these atomizers. Fibres make no difference either. A valuable *New Product* awaits you.

We will gladly furnish additional information about UNIT SPRAY DRIERS if you will write us.

UNIT SPRAY DRIERS

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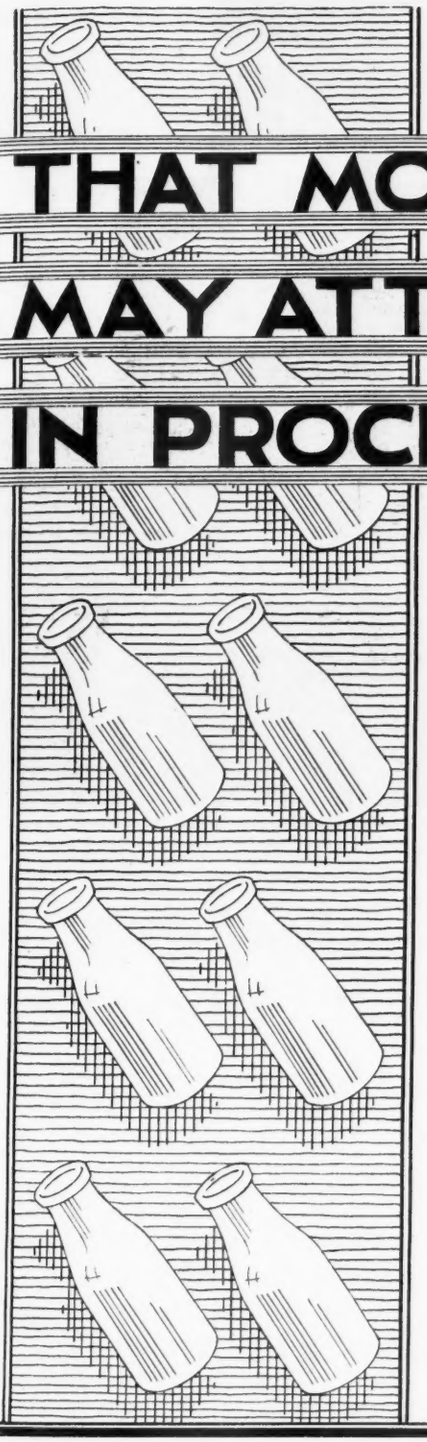

THAT MODERN DAIRIES MAY ATTAIN UNIFORMITY IN PROCESSING

HANDLING large quantities of milk—in a manner to meet requirements of International Milk Dealers Assn., Depts. of Health, and the high standards of modern dairying—requires suitable, accurate instruments.

The notable success of Bristol's Recording (Dairy Type) Thermometers and automatic controllers at many prominent dairies testifies to the big advantages of these specially developed instruments in securing product uniformity. They enable dairymen to maintain desired temperature in sterilizing, pasteurizing, cooling and storage—to furnish authentic records—and supply continuous, dependable information of conditions.

The new dairy model 211-M Bristol's Recording Thermometer has a moisture-proof case made of non-ferrous metal. The chart has a wide open scale at critical temperature zones, with one degree graduations.

THE BRISTOL COMPANY - - Waterbury, Conn.

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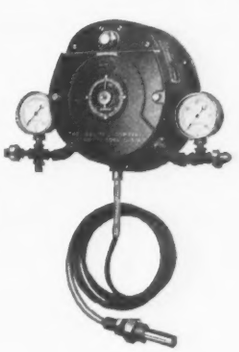
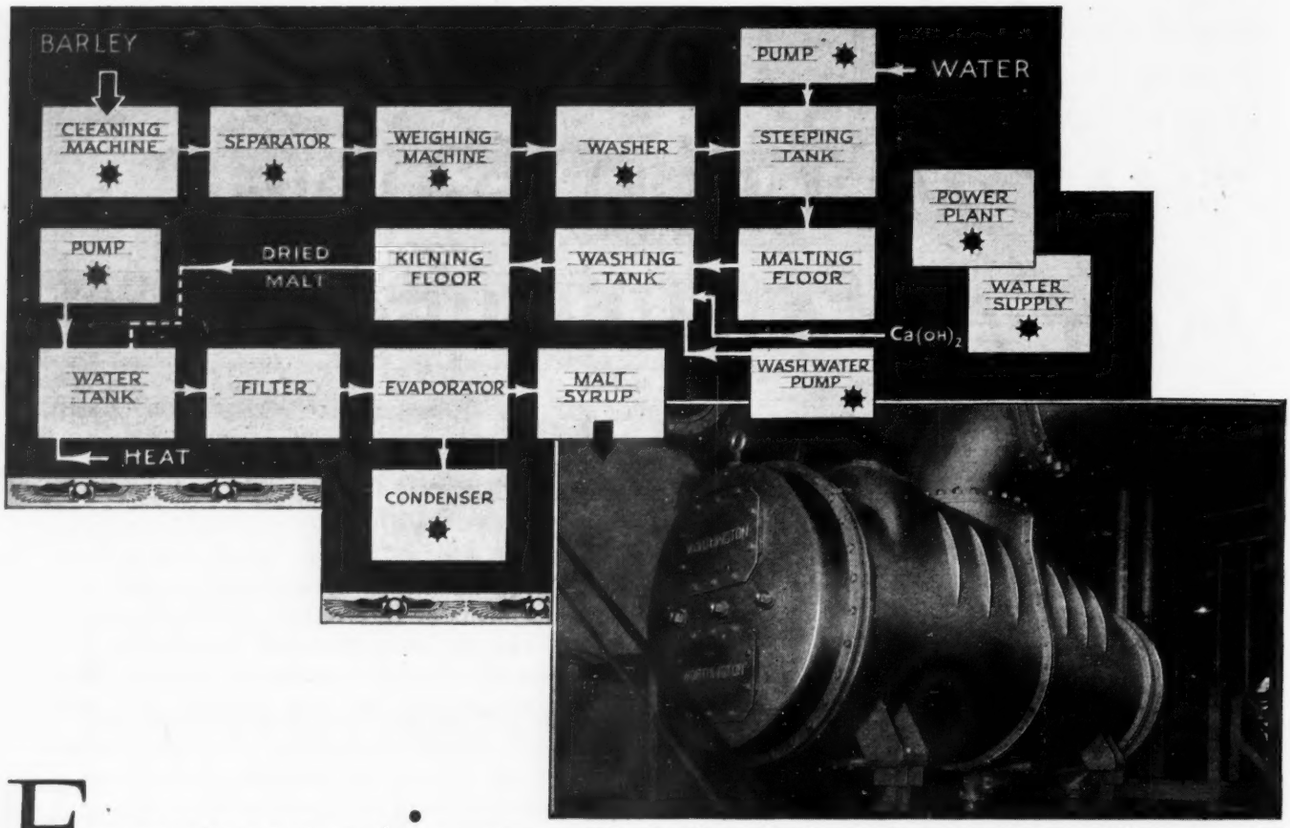
At left—Bristol's Improved Model 211-M Recording (Dairy) Thermometer, the result of several years study on part of Bristol engineers in cooperation with leading dairy authorities.

Bristol's Thermometer Controllers automatically hold temperature at predetermined range—used in pasteurizing, cooking, baking, heating, cooling, refrigerating, drying, mixing, etc.

Bristol's Air Operated Control Equipment automatically maintains predetermined temperature, pressure or time. Used in connection with retorts, blanchers, cookers, peelers, sterilizers, process kettles, continuous cookers, open tanks, vats, etc.





This Worthington Surface Condenser is used by a well known manufacturer to maintain a vacuum on its pans for the evaporation of malt syrup

Evaporation . . . *Safer and cheaper* with Worthington Condensers

PROGRESSIVE process manufacturers have torn a leaf from the book of the electric power plant . . . by putting the surface condenser to work.

Used to condense aqueous and other vapors during evaporative processes, surface condensers cause evaporation to take place at lower temperatures, with reduction in costs and hazards . . . and increased purity of product.

In the building of condensers for industrial plants, Worthington draws upon the same experience and manufacturing resources as those responsible for an acknowledged leadership in the development of modern power plant units.

A qualified engineer at the nearest Worthington office will be glad to show you how Worthington condensers and other products can be used to advantage in *your* plant.

At each step marked by this symbol, one or more of the following Worthington products can be used to advantage

PUMPS All sizes...All Types For All Services Any Capacity...Any Pressure	COMPRESSORS Stationary and Portable
CONDENSERS and Auxiliaries	ROCK DRILLING EQUIPMENT Rock Drills
DIESEL ENGINES	Automatic Heat Treating Machines
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PICK-UP GUM

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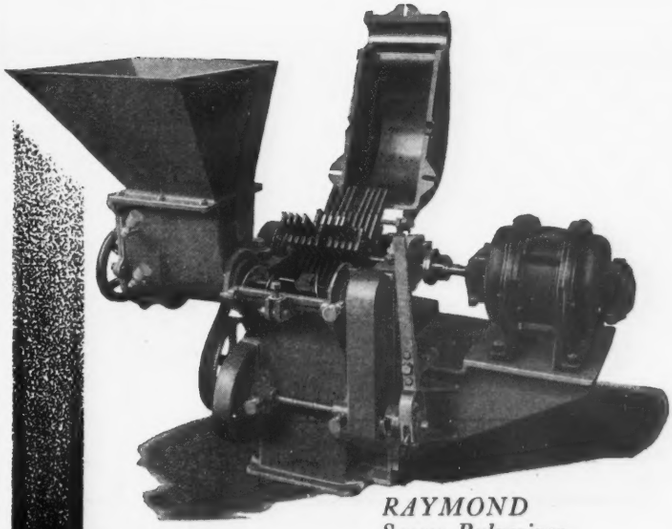

RAYMOND Screen Pulverizer the modern unit for pulverizing food products

Here's Milling Economy!

Right in step with the times, comes the Raymond Screen Pulverizer, leading the way to lower costs in pulverizing food products. It is a complete, self-contained unit that grinds and sizes the material in one operation—no other equipment needed.

Check over the advantages of the Raymond Screen Pulverizer, point by point, and note how its many economies will add to your profits:—

Low first cost
Easy to install
Simplified operation
Small power consumption
Trouble-free service
Minimum floor space
Low cost of upkeep

With the Raymond Screen Pulverizer in your plant, you can duplicate the profitable results that other satisfied users are getting in the production of ground spices, powdered milk, cereals, sugar and similar products.

For further details of this compact pulverizing unit—just mail the coupon. If you have a special grinding problem, tell us your requirements. Our 44 years' experience is at your service.

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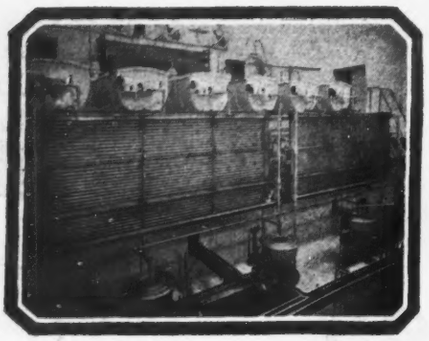
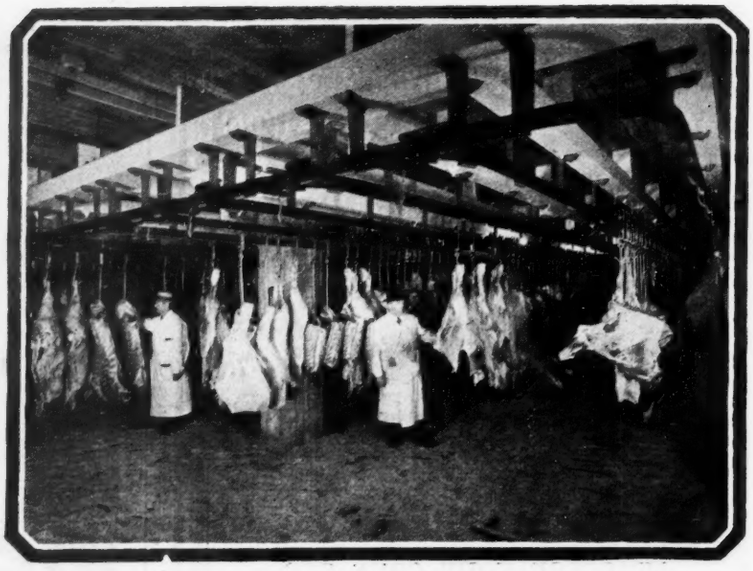
FRICK

Refrigeration



The Chestnut Farms Dairy at Washington, D.C., has a Frick Plant



One of Ten Rooms Cooled by Frick Refrigeration at Meat Packing Plant of John Morrell & Co., Philadelphia

It's always wintry cold when you're equipped with Frick Refrigeration.

Better than that, the temperature is regulated to be low and uniform, to suit your special requirements.

Whether you handle meats, dairy products, fruit and produce, carbonated beverages, canned or preserved foods, confectionery, candy, ice cream, or just operate an old fashioned corner grocery—there's a Frick Refrigerating plant of the size and type you need.

Dependable, profitable equipment. Over a dozen firms with world wide reputations in the food field are each using from 25 to 550 Frick machines.

Write for literature and estimates now.

Frick Company
WAYNESBORO, PA., U.S.A.
ICE MACHINERY SUPERIOR SINCE 1882

Branch Offices, Distributors and Stock Points in 85 Principal Cities throughout the World

FREE! 30 days' TRIAL

New TAG Steam Trap

—with Unique Differential Setting Feature

NEVER before in the history of Thermostatic Steam Trap manufacture has industry been offered a trap with outstanding element of the TAG Differential Setting Feature which makes it possible to discharge condensate at a temperature corresponding to a uniform differential pressure from 0 to 20 lbs. below the operating steam pressure . . . a sure guarantee of actual saving of steam dollars.

TAG, with characteristic thoroughness, has included other outstanding economies, among which are reversible as well as renewable Monel seats and discs, assuring double life to both these wearing parts.

You alone can be the judge and jury of TAG Steam Trap performance right on your own steam lines. The coupon will bring as many traps as you need . . . FREE for 30 days' trial! No strings attached. Mail it TODAY!

C. J. Tagliabue Mfg. Co.

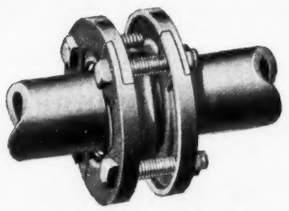
Gentlemen:

Please send us..... Traps No. 2 for free trial. After 30 days we will either return them or accept your invoice at $12 each, Net, F.O.B. Factory.

Name .....

Address .....

C. J. TAGLIABUE MFG. CO.
Park and Nostrand Aves.
Brooklyn, N. Y.



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"There is Duriron pipe in our factory," say Lutz & Schramm Co., Pittsburgh, "which has been in use for handling vinegars for a period of 12 to 15 years, and there is no evidence of injury by the vinegar to the equipment, and certainly none to the vinegar from the equipment."—The record of Duriron in food processing merits investigation. Write us.

THE DURIRON COMPANY, INC.
440 N. Findlay St., Dayton, Ohio

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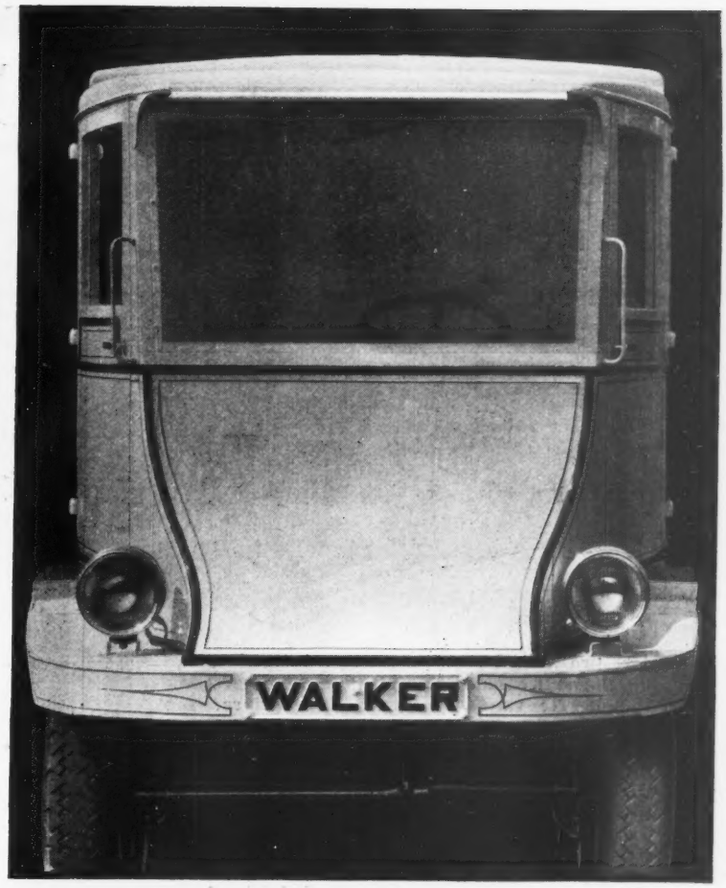
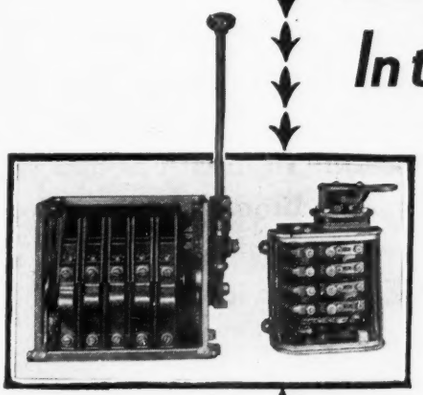
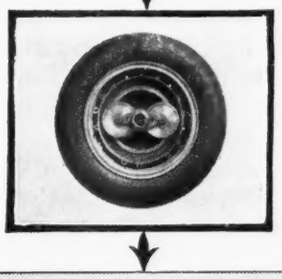
WALKER
Presents



Lower DELIVERY COSTS
In their NEW *models of Electric Trucks*





With their increased speed and greater cruising radius the NEW Walker Electric trucks are now suited for all multi-stop routes. Best of all, they are more economical than ever before because of the new patented developments which include the double reduction Balance Drive, the Cam type, manually operated, contactor controller with reverser and main switch, and pneumatic tires as standard equipment.

Reduce your delivery costs and dress up your equipment by adding these smart appearing, noiseless, odorless delivery trucks. For complete information on the most dependable and economical type of delivery equipment write for Bulletin 50.

WALKER VEHICLE COMPANY
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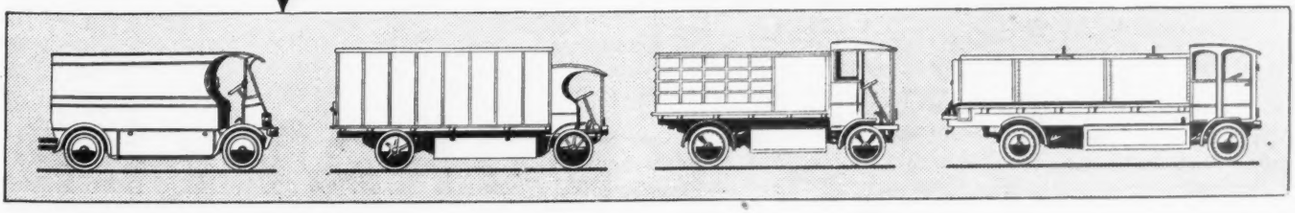
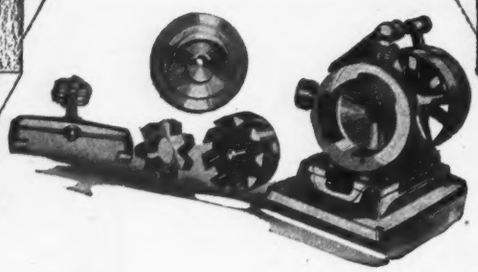


NO VALVES
IN THIS PUMP



Just two *helical* gears—constantly in mesh, make up the entire moving element of the Perfection Pump. No valves, no springs, no reciprocating parts.

And as these helical gears revolve, they *shear* into the column of liquid food product, smoothly—without agitation or churning action—but with positive displacement and an even pulsationless flow.

The model illustrated below,—chain drive or V belt drive,—takes up very little floor space. Another advantage,—the motor is mounted on top of a pedestal,—up off the floor.

Milk, cream, ice cream mix, fruit juices, and hundreds of other liquid food products can be pumped ever so much more satisfactorily with a Perfection Pump. It is especially adapted for pumping thick liquids.

We will gladly send you full details and specifications. Ask for our Bulletin 284.

PERFECTION MFG. CO.
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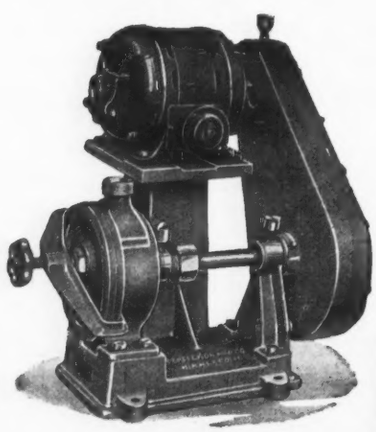
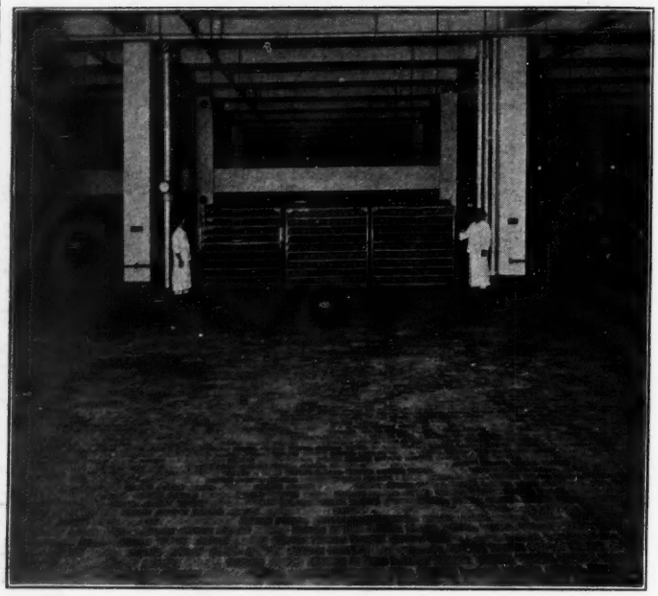


PERFECTION
ROTARY PUMPS

BETTER FLOORS



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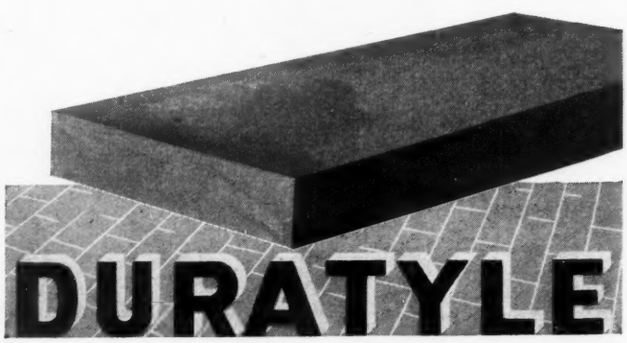


DURATYLE

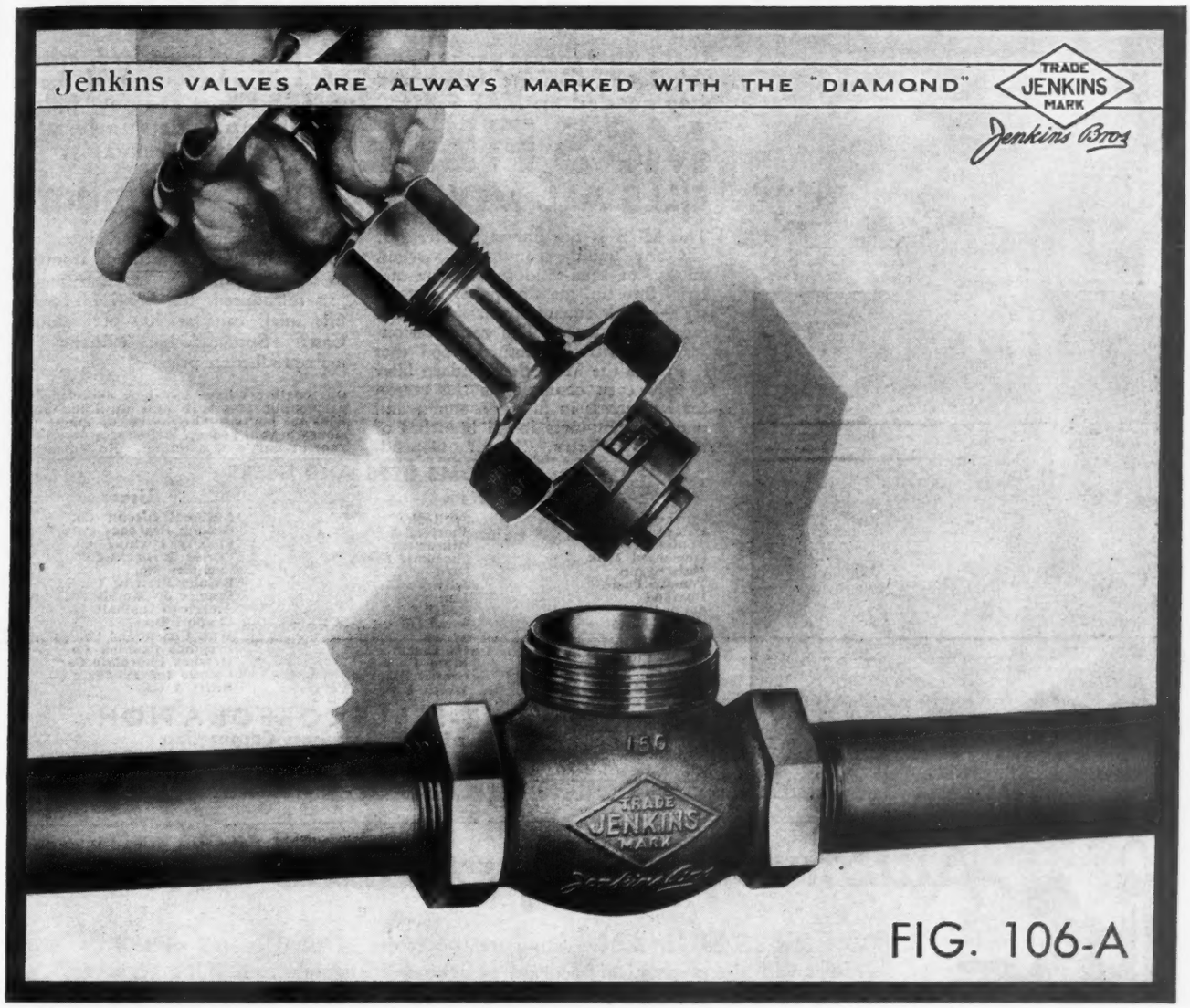


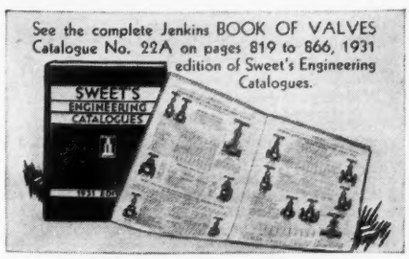
Fig. 106-A Jenkins Standard Bronze Globe Valve, Screwed. For 150 lbs. steam or 250 lbs. water working pressure. Special features such as one-piece screw-over bonnet and slip-on stay-on disc holder obtainable also in angle, cross, and check patterns.

DISC HOLDER slips on or off but won't fall off

TO renew the disc in a Fig. 106-A Jenkins Standard Bronze Globe Valve is a simple matter that takes only a few moments. Slip the disc holder containing the old disc off the spindle. Slip on a new disc holder containing the disc, and the job is done. Every engineer appreciates this convenience.

In addition, there is the exclusive advantage of the stay-on principle which you will find ONLY in Fig. 106-A. To illustrate: suppose a Fig. 106-A is installed in an overhead pipe line. Before the bonnet is removed the spindle need be given just an opening turn or so and the bonnet and trim can be removed, YET THE DISC HOLDER CANNOT FALL OFF. The Jenkins Disc is renewable. It can conveniently be removed from the disc holder just by unscrewing the disc nut. It is specially compounded for each service.

Our Bulletin 141 describes this Jenkins feature fully. Ask your supply house.


See the complete Jenkins BOOK OF VALVES Catalogue No. 22A on pages 819 to 866, 1931 edition of Sweet's Engineering Catalogues.
SWEET'S ENGINEERING CATALOGUES

◆

JENKINS BROS.

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VALVES
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"But my filling problem is different"

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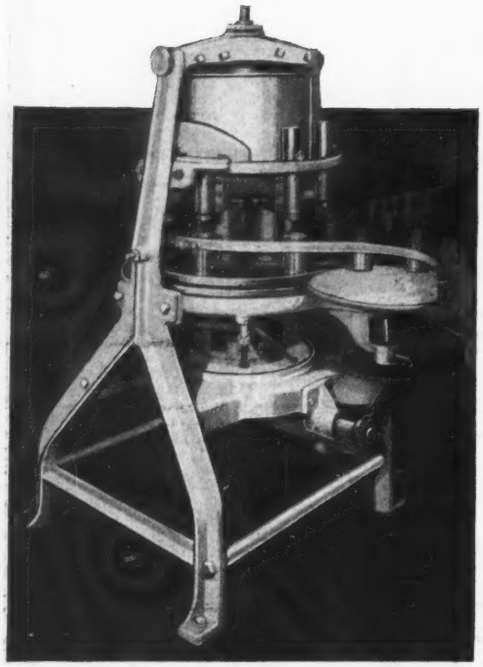
M&S FILLER

FILLS ALL MOIST OR VISCID PRODUCTS



The M&S is the universal filler. It fills any liquid, semi-liquid, viscous, mushy, or semi-solid mixture or material into tin, glass or paper containers,—round, square, oval, flat—small mouth or large. The same piston-forced, positively-measured feed that has made the M&S the standard filler in 600 corn canneries is the reason for its success in filling common and unusual substances in all branches of the food industry. Speed? Depending on product and container, the M&S is filling at speeds of from 90 to 200 per minute. A new model just introduced, the M&S Hi-Speed, fills small cans at 300 per minute! Cost? Special-design efficiency at mass-production price.

Our engineers have had long experience in overcoming just such difficult filling problems as yours. Their services might put money in your pocket. Write today describing your product and container. No obligation.

SOME USES AND USERS

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Pumpkin	Shortening	General Seafoods Corp.
Applesauce	Mincemeat	Cudahy Packing Co.
Condensed Milk	Chocolate Syrup	Crosse & Blackwell
Malt Syrup	Lard	Campfire Co.
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Dogfood	Jam	Procter & Gamble Co.
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Cheese	Syrup	Wm. Underwood Co.
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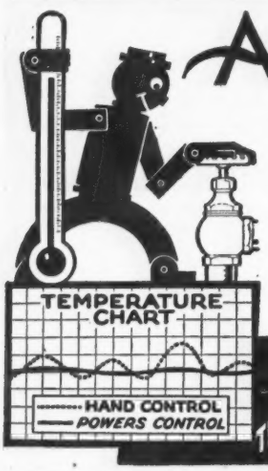
SPRAGUE-SELLS CORPORATION
Division of Food Machinery Corporation
306 W. WASHINGTON ST., CHICAGO, ILLINOIS

Automatic Temperature Control



TO ERR IS HUMAN—eliminate the errors of hand control of temperature with the mechanical accuracy of a Powers Regulator. It will quickly pay for itself by speeding up production—helps you to get a still better and more uniform product, and stops steam losses due to overheating. Let our engineers study your problems of temperature control and recommend the type of regulator that will give the best results at the lowest cost.

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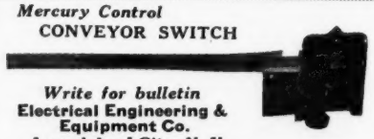

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Long Island City, N. Y.

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(continued from opposite page)

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ATTRACTIVE PRICES · RELIABILITY · PROMPT DELIVERY
ALL MACHINES RELIABLY GUARANTEED FOR ONE YEAR

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Food Process Machinery

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Vacuum Pans, 50 to 500 gal.
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also Wood TANKS and CASKS, all kinds. BOTTLERS' MACHINERY, WASHERS and RINSERS, FILLING and CAPPING Machines, PASTEURIZERS and LABELERS, FILTERS and FILTER PRESSES, every size and style, ROTARY STEAM DRYERS.

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Buffalo Nut and Food Chopper, motor drive.
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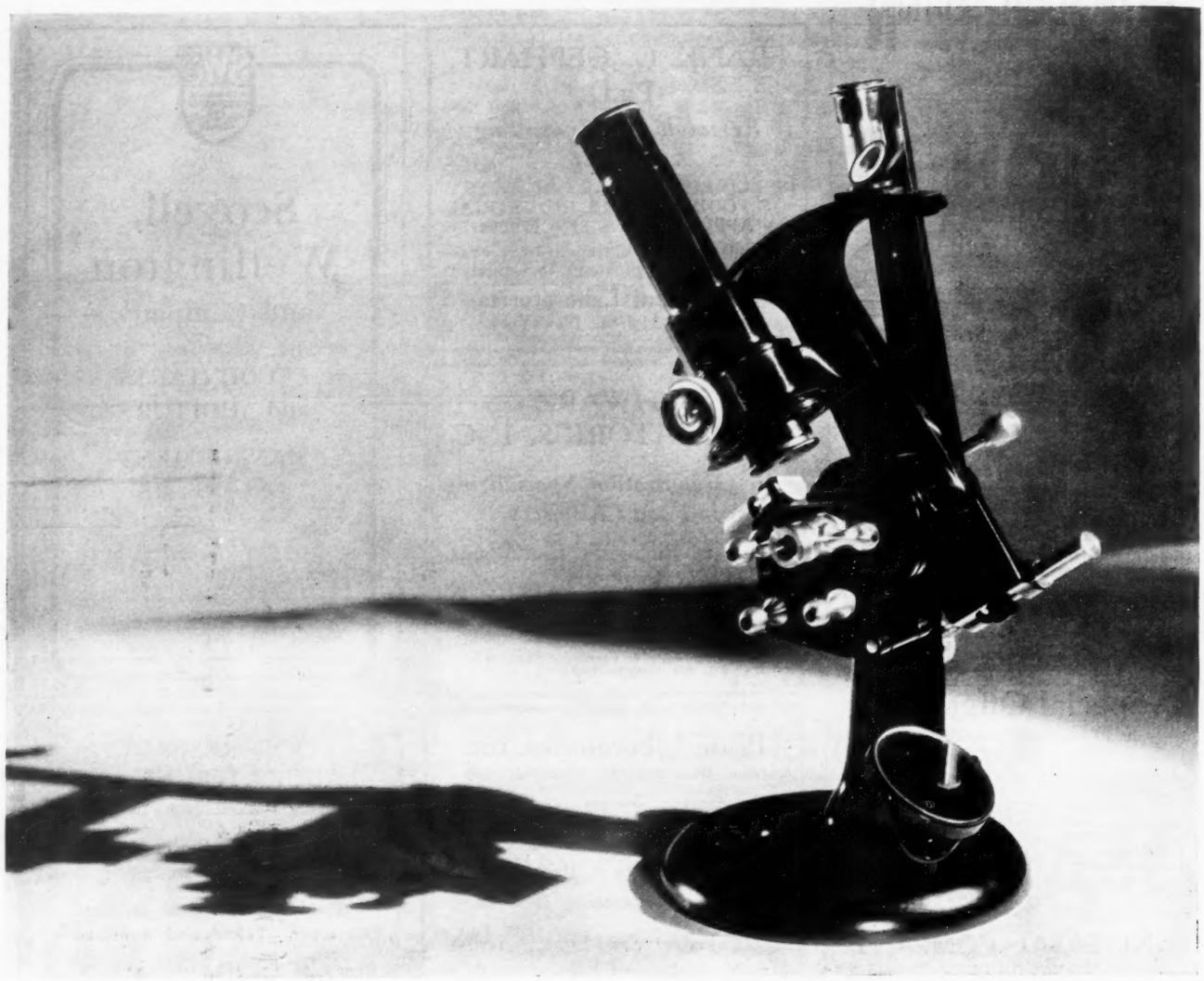

A *Master Key to Process Control*

PROCESS control is largely a matter of intelligent use of precision instruments. Many production processes can be speeded up or made more accurate and uniform when they are supervised from the laboratory.

Such industrial uses as control of boiling various materials; determination of total solids in tomato pulp and similar products; the identification of fats and shortening materials; the determination of purity and strength of various substances — all make the B & L Abbe Refractometer an indispensable instrument in food production laboratories.

This Abbe Refractometer is simple and easy to operate, yet highly accurate. It has a wide range of indices which gives it an exceptional number of applications and allows you to do practically the same work that would require several special refractometers in which the index range is limited. Write for complete information on this Refractometer. BAUSCH & LOMB OPTICAL CO., 603 St. Paul Street, Rochester, N. Y.

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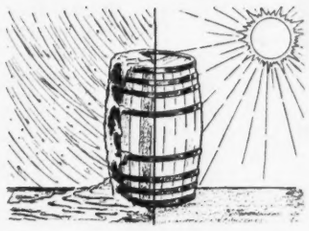

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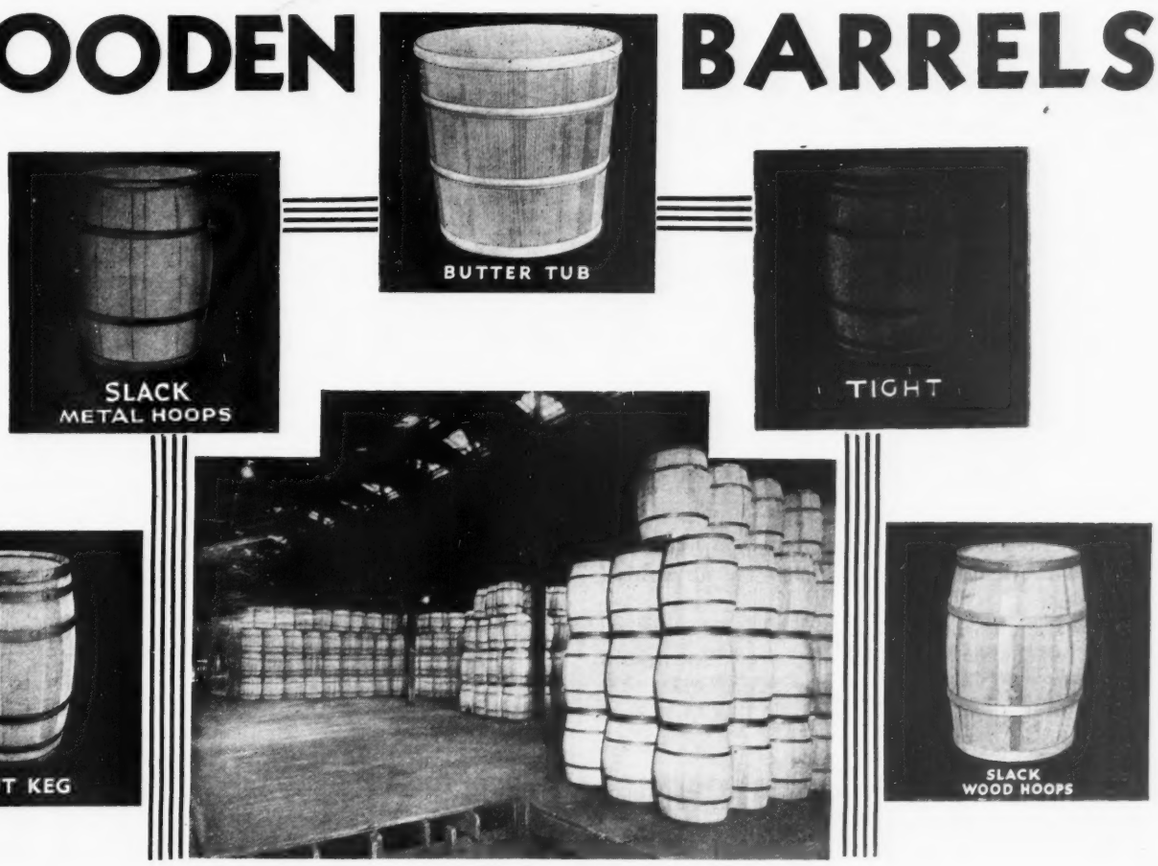
WOODEN BARREL



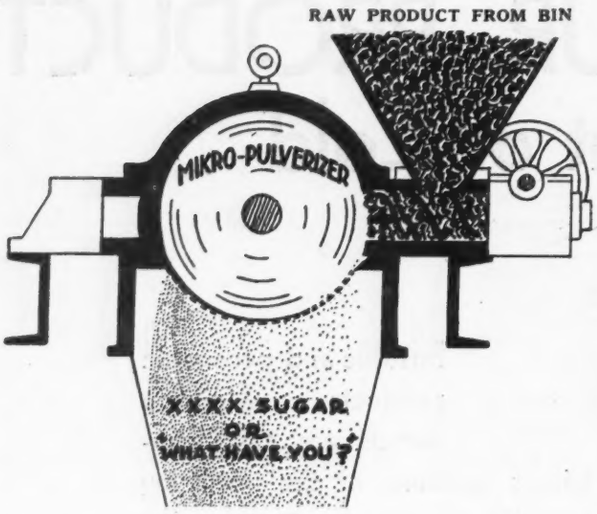


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Figure it out.

One Mikro Pulverizer, requiring 400 sq. feet floor space replaced four machines requiring 4,000 sq. feet—a saving of 3,600 sq. feet.

At $1.50 a sq. ft., simple arithmetic gives the answer $5,400.—saved in floor space alone—a figure which MIKE'S owner actually credits to this installation.

And this is only part of the story. Horsepower was cut from 130 to 40 with a saving of over $3,500. The saving on these two items alone was $8,900, and the complete new equipment installed cost less than $3,500. Incidentally three men were released for other duties. And the pulverizing is far superior and more uniform since MIKE went to work for this prominent user.

Let us study your problem. Send us your samples with such information as is necessary to prove out in our laboratory, at no cost to you.

*MIKE—(MIKRO-PULVERIZER) . . . *the modern machine for pulverizing XXXX sugar and other commodities to similar fineness.*

PULVERIZING MACHINERY CO.
30 Church Street, New York, N.Y.

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• TO ADVERTISERS •

This index is published as a convenience to the reader. Every care is taken to make it accurate, but *Food Industries* assumes no responsibility for errors or omissions.

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Write to the Equipment Information Bureau of FOOD INDUSTRIES *for "where-to-buy" data on any products on which you would like further details.*

Is the "Move Man" *walking away your profits?*

THERE are departments in most plants where materials are still moved about by hand . . . where instead of flowing from operation to operation in a uniform, rapid stream, they accumulate along the line of production. Workmen paid for what they can perform when working with conveyors and power machinery are often held up waiting for stock—all because too much material is still being moved by hand.

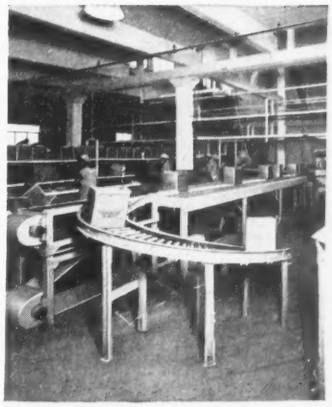
The result is higher costs which stamp themselves in red on the balance sheets.

In your own plant there may be departments where human handling is throttling production. Would you like to know about them and what can be done to bring them "into line"?

A Lamson Engineer, trained in industrial routing, will gladly make an analysis of the situation—and give you the facts. If conveyors are needed he will tell you what they can accomplish and give you their cost. He will be equally as frank in telling you if conveyors are not required. It will cost you nothing to get these facts. Write our main office and a capable engineer will call.

THE LAMSON COMPANY, SYRACUSE, N. Y.

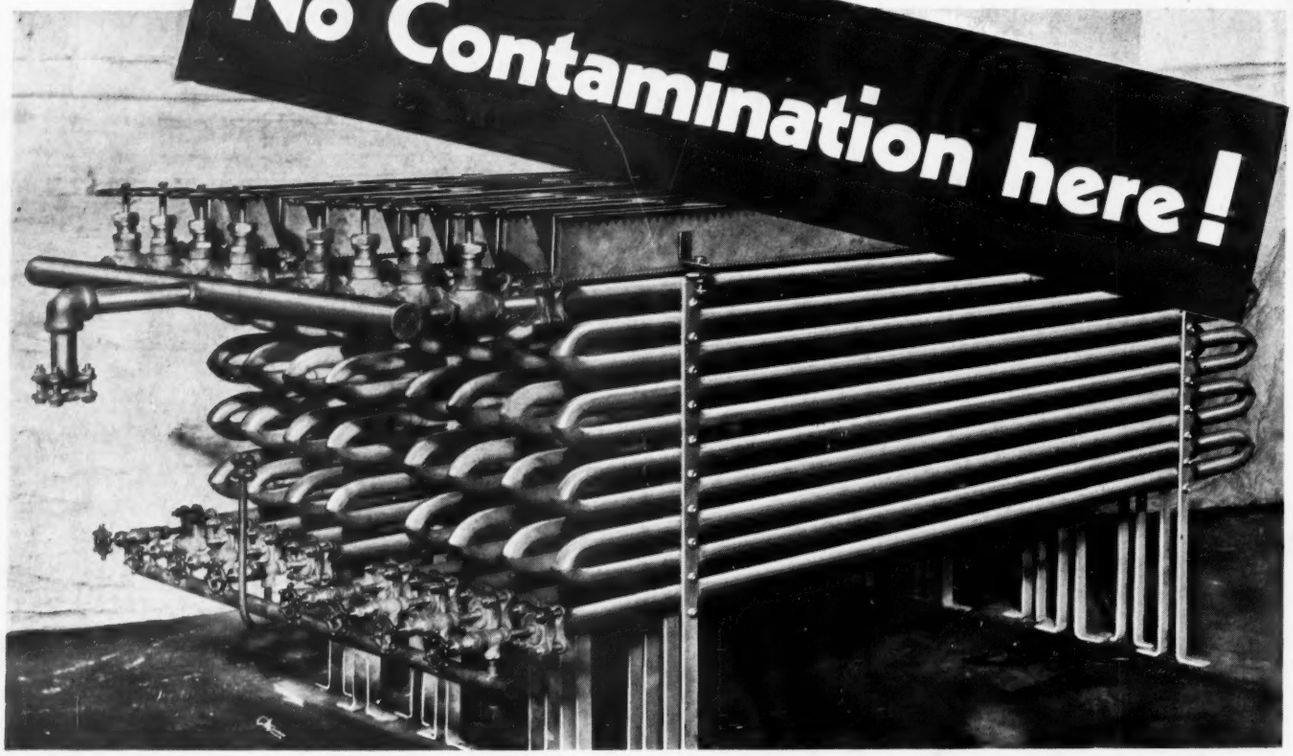
Offices in Principal Cities



Production per square foot of floor space has been doubled by Lamson Conveyors at Ontario Biscuit Co., Buffalo, N. Y.

LAMSON CONVEYOR SYSTEMS

Allegheny Metal Permits



INSOLUBILITY *almost perfect, is the feature that recommends Allegheny Metal for these coils used to cool distilled water by the Louisville Coca Cola Bottling Co., Louisville, Ky.*

Its insolubility makes it best for use in food handling equipment.

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2. *Can be drawn, stamped, machined, spun, cast, forged.*
3. *Far stronger than mild steel.*
4. *Will take any finish from dull to mirror.*
5. *Is non-magnetic.*
6. *Resists denting and abrasion.*
7. *Is readily annealed; may be welded and soldered.*
8. *Is produced in practically all commercial forms.*

In these cooling coils, Allegheny Metal must keep distilled water in perfect condition to mix with Coca Cola syrup before bottling . . . really a simple task for a metal that has withstood attacks by acids in vinegar, mayonnaise, cheese, acidophilous milk, etc.

Food manufacturers everywhere are swinging to the use of Allegheny Metal equipment because they know it's insoluble in food acids . . . They know it's *safe*. Such insolubility guards the food while guaranteeing a lifetime of service from the equipment.

Further, Allegheny Metal is far stronger than mild steel. It has strength to support itself and a heavy batch, too. Yet it's lighter in weight than most alloy now used. It's non-magnetic. It cleans as easily as glass—to aid sanitation.

Some day you'll use Allegheny Metal. The greater your corrosion problem . . . the sooner it will be. Undoubtedly some of your friends are using it now. Ask their opinion of it. Specify it in your next order for equipment.

Allegheny METAL

ALLEGHENY METAL

ALLEGHENY STEEL COMPANY, Brackenridge, Pa.

Offices: New York, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Philadelphia, St. Louis, Milwaukee, Los Angeles. *Warehouse Stocks:* Joseph T. Ryerson & Son, Inc. — Chicago, Cleveland, Milwaukee, St. Louis, Cincinnati, Detroit, Buffalo, Boston, Jersey City, Philadelphia . . . *In Canada:* Samuel, Son and Co., Ltd., Toronto.

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